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The quality of hotel employee meals, and employees' perception of the quality

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THE QUALITY OF HOTEL EMPLOYEE MEALS AND EMPLOYEES'PERCEPTION OF THE MEALS

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LIST OF ABBREVIATIONS

ACS - American Cancer Society

ADA - American Dietetic Association

AHA - American Heart Association

AICR – American Institute for Cancer Research

AI – Adequate Intakes

ANOVA - Analysis of Variance

ARS – Agricultural Research Service

ASFSA - American School Food Service Association

CHD - Coronary Heart Disease

CNPP – Center for Nutrition Policy and Promotion

CSFII- Continuing Survey of Food Intake by Individuals

CVD - Cardiovascular Disease

DGA - Dietary Guidelines for Americans

DGAC – Dietary Guidelines Advisory Committee

DHKS – Diet and Health Knowledge Survey

DM - Diabetes Mellitus

DRI – Dietary Reference Intakes

DV - Dietary Variety

EAR – Estimated Average Requirement

EDR - Employee Dining Room

ERS – Economic Research Council

GMA - Grocery Manufacturers Association

HDL-C – High-density lipoprotein cholesterol

HEI - Healthy Eating Index

IDDM - Insulin Dependent Diabetes Mellitus

IFIC – International Food Information Council

IRB – Institutional Review Board

JACN - Journal of the American College of Nutrition

KAP – Knowledge, Attitude, and Practices

LDL-C – Low-density lipoprotein cholesterol

LSU – Louisiana State University

NCEP - National Cholesterol Education Program

NCI - National Cancer Institute

NCHS - National Center for Health Statistics

NHANES - National Health and Nutrition Examination Survey

NHEFS - National Health and Nutrition Examination Follow up Study

NIH - National Institute of Health

NLEA - Nutrition Labeling and Education Act

NIDDM – Non-Insulin Dependent Diabetes Mellitus

NCEP - National Cholesterol Education Program

NRA - National Restaurant Association

ODPHP - Office for Disease Prevention and Health Promotion

RDA - Recommended Dietary Allowance

REA – Recommended Energy Allowance

RNI – Recommended Nutrient Intakes

SAS – Statistical Analytical Systems

TLHS – Tufts Longitudinal Health Study

USDA- United States Department of Agriculture

USDHHS- United States Department of Health and Human Services

SNO - Sheraton New Orleans

US - United States

LIST OF DEFINITIONS

Adequate Intakes – A recommended daily intake level based on observed or experimentally determined approximations of nutrient intake by a group (or groups) of healthy people.

Arteriosclerosis - Abnormal thickening and loss of elasticity in the arterial walls.

Carbohydrate - A class of organic compounds composed of carbon, hydrogen, and oxygen, including starches and sugars, produced in green plants by photosynthesis; important source of food for animals and people.

Cardiovascular Disease - A disordered or abnormal condition pertaining to, or affecting the heart or blood vessels resulting from the effect of genetic or developmental error, infection, nutritional deficiency or unfavorable environmental factors.

Cholesterol - A sterol abundant in animal fats, brain, and nerve tissue, muscle, and eggs, which functions in the body as a membrane constituent and as a precursor of steroid hormones: high levels in blood are associated with arteriosclerosis and gallstones.

Coronary Heart Disease - A disordered or abnormal condition pertaining to the heart, resulting from the effect of genetic or developmental error, infection, nutritional deficiency, or unfavorable environmental factors, that is characterized by the narrowing of the coronary vessels that feed the heart, may be caused by fat and cholesterol deposits.

Dietary Guidelines for Americans - A set of recommendations that provide nutrition guidance for Americans 2 years of age and older about food choices that promote health and prevent disease.

Creole - A dish indigenous to the French-speaking generally urban population of Louisiana made with tomatoes, peppers, onions, and also some type of meat, fish, or poultry, often served with rice.

Dietary Fiber - The structural parts of plants, such as cellulose, hemicellulose, pectin, lignin, and guar that are wholly or partly indigestible, acting to increase intestinal bulk and peristalsis. It aids digestion and protects the colon health.

Dietary Reference Intakes – Reference values intended as quantitative estimate of nutrient intakes for planning and assessing diets for healthy people.

Estimated average requirement – A nutrient intake that is estimated to meet the requirement of half the healthy individuals in a group. It is used to assess adequacy of intakes of population groups and, along with knowledge of the distribution of requirements, to develop RDAs.

Fat - Any of several oily solids or semisolids that are water-insoluble esters of glycerol with fatty acids. Fat is the chief component of animal adipose tissue and many plant seeds; used in cookery and in the manufacture of soaps and other products.

Food Guide Pyramid - A Daily Food Guide devised by the USDA that provides a pictorial description of the Daily Food Guide and includes the most notable food groups, the number of servings recommended, the serving sizes, and the foods within each group.

Healthy Food Items - Food items low in fat, and saturated fat, have limited amounts of cholesterol and sodium, and provide significant amounts of one or more of the key nutrients vitamin A and C, iron, calcium, protein, or fiber.

Healthy Eating Index - Consists of scores for consumption of the suggested number of servings of each of the five food groups; level of intake of total fat, saturated fats, cholesterol, sodium, and a measure of dietary variety.

Hypertension - An arterial disease characterized by an elevation of the blood pressure, especially the diastolic pressure, characterized by a systolic pressure of 140 mm Hg or greater, or a diastolic pressure of 90 mm Hg or greater.

Type 1 Diabetes mellitus - A metabolic disorder characterized by high blood glucose due to the pancreas losing its ability to synthesize the hormone insulin. Patients must inject insulin to assist the cells in uptake of the needed glucose from the blood.

Kilocalorie - The amount of heat required to raise the temperature of 1 kilogram of water by 1degree Celsius. It is a unit used in estimating the energy value of food.

Light Food Items - Food items that contain one-third fewer calories or half the fat and sodium of the reference foods to which they are being compared.

Low Cholesterol Foods - Food items that contain 20 milligrams or less, and 2 grams or less of saturated fat per serving.

Low Fat Food Items - Food items that contain 3 grams or less, of fat per serving.

Low Sodium Food Items - Food items that contain 140 milligrams or less of sodium per serving.

Monounsaturated Fat – A particular class of unsaturated fats. Liquid at room temperature, they become cloudy if refrigerated; an example is olive oil.

Micronutrients - Essential nutrient, such as vitamins and trace minerals, that are required in minute amounts.

Type 11 Diabetes Mellitus - A metabolic disorder characterized by high blood glucose, due to the insulin resistance of the body's cells, including fat cells. It is normally treated with diet and exercise.

Nutrients - Substances the body uses for the growth, maintenance, and repair of its tissues.

Polyunsaturated Fat - A class of unsaturated fats, liquid at room temperature or when refrigerated. They are primarily from vegetable sources, although fish and marine fats are also polyunsaturated.

Protein - Any of numerous organic molecules containing nitrogen constituting a large portion of the mass of every life form, composed of 20 or more amino acids linked in chains that are essential for building body proteins. Used to build muscle and maintain and repair lean tissue, including muscle and body organs. Proteins come from plant and animal sources.

Recommended Dietary Allowance – The average daily dietary intake level that is sufficient to meet the nutrient requirement of nearly all (97% to 98%) healthy individuals.

Recommended Nutrient Intakes - A calculation of the daily amounts of nutrients required by an individual used mainly in Canada.

Saturated Fat – A class of single-bonded animal or vegetable fat, abundant in fatty meats, dairy products, coconut oil, and palm oil, that are hard at room temperature and tend to raise serum cholesterol levels.

Single Index Nutrients - Nutrients that permit inferences to be drawn regarding the intake of other nutrients given the prevailing food supply and food selection practices in a population.

ABSTRACT

Growing interest in nutrition and health and the increase in the number of people eating away from home gives power and responsibility to retail foodservice operators. Employees of hotels, restaurants, and other food service establishments are in an important position to influence and impact the diet of the general public since they cook, recommend, and serve customers who visit their institutions. Healthful foods are available, and chefs would benefit from nutritional guidance. The escalating importance of foodservice establishments as the main distribution sites for Americans' meals highlights the importance of the chef's role in preparing and providing healthful food consistent with the Dietary Guidelines for Americans (DGAs).

Review of current literature indicates that there is very little research on the meals served to employees in the food and hospitality industry while on the job and whether these employees who prepare and serve the public meals are aware of the elements of a healthy meal. The goals of this study were dual in nature. The first goal was to assess the nutrition quality of the meals served in a hotel employee cafeteria. The second goal was to determine the nutritional knowledge, attitudes, and behavior of employees of the Sheraton New Orleans hotel (SNO), and their perception of the quality of the meals they are served in the employee dining room (EDR), as well as an interview with the chef to determine his menu planning strategies, food preparation practices, attitude toward nutrition and his perception of the healthful quality of the SNO hotel meals.

Results from this study suggest that the meals served in the SNO employee cafeteria generally met the recommendations of the DGA. The meals were varied, met the recommendations on proportions of the major nutrients, but were relatively high in fat content. The results also suggested that employees in the SNO were aware of the components of healthy nutritious meals but generally chose their meals based on taste rather than nutritional quality. Many participants perceived healthy nutritional practices as expensive and time consuming.

The SNO Hotel chef stated that the ability to provide meals that meet the DGA is influenced by the cultural and regional nutritional practices and beliefs of a region. The responses of the chef and participants in this study suggested that more information on less costly and time consuming ways of practicing good nutrition and a healthy lifestyle would assist employees in the SNO to effectively incorporate healthy eating habits into their work lives.

CHAPTER 1

INTRODUCTION

Reports on the diets of Americans often focus on nutrient intake because historically nutrients have been considered the dietary components of interest and because food-consumption surveys were originally designed to track them (Kreb et al., 1997). According to the American Dietetic Association Survey of American Dietary Habits in 1993, 82% of Americans recognized the importance of good nutrition (Reichter et al., 1998). However, the demand for healthful foods raises the level of expectation and dissatisfaction among consumers when eating away from home (Reichter et al., 1998). A 1995 American Institute of Wine and Foods, restaurant and institutions survey reported that fewer than 10% of respondents said restaurant food was nutritionally satisfactory. The goal of promoting the availability of healthful foods in restaurants and institutions is highlighted in several government and professional initiatives. The Institute of Medicine (Reichler et al., 1998) named insufficient background and training in nutrition and recipe modification among chefs as major barriers to offering healthful foods in foodservice establishments. A goal of Healthy People 2010 is to increase the proportion of restaurants that offer identifiable low-fat, low-energy food choices that are consistent with the Dietary Guidelines for Americans (DGA) (www.health.gov.)

This research determined if the Sheraton New Orleans hotel (SNO) chef's nutrition knowledge, food preparation practices, and attitudes toward nutrition were consistent with preparing and serving food to hotel employees that adhere to the

DGA's recommendations, and whether the employees were aware of the nutritional quality of the meals they were served.

PURPOSE AND OBJECTIVES

The purposes of this study were twofold:

1) to assess the nutrient quality of the SNO employee meals

2) to determine the menu planning strategies and food preparation practices of the chef of the SNO, and to assess the acceptability of the SNO employee meals to employees.

The objectives of the study were to:

1) conduct a nutritional analysis of each meal in the 20-day menu cycle.

2) evaluate the menus to determine if they followed the recommendations in the DGA regarding nutrient intake.

3) administer a survey to a self selected sample of the SNO hotel employees to determined the following information: a) nutritional knowledge, b) nutritional attitudes, and c) nutritional behaviors.

4) interview the Executive Chef of the SNO hotel to determine menu planning strategies, food preparation practices, attitude toward nutrition, and his perception of the healthful quality of the SNO hotel meals.

RESEARCH QUESTIONS

Does the quality of the SNO hotel employee meals meet the DGA?

Are employees aware of the healthful benefits of their meals?

ASSUMPTIONS

Assumptions that were made in the design and implementation of this study were:

1) The sample of SNO employees who participated in this study is representative of the SNO employee population.
2) The information collected from this survey is not applicable to employees in all hotel and foodservice establishments, as the sizes of all hotels, gender, race, as well as the educational level backgrounds of their employees may vary from the SNO.
3) The assessment tool used in this study is a reliable and valid tool for collecting information about SNO employees' nutritional attitude, nutritional behavior, nutritional knowledge, nutritional practices, and their perceptions of the quality of a healthful diet.

LIMITATIONS

Limitations of the study were:

1) The sample was not selected randomly since only full-time employees who have worked at the SNO for at least six months were invited to participate.
2) The study population consisted of many college educated professional employees, majority of whom were female.
3) Survey respondents may not have answered the questionnaire truthfully due to embarrassment, shame, or the desire to give the "right" answers.
4) The number of questionnaires completed and returned (120), that is 40% of the total questionnaires distributed, may limit the power of the data and interpretation of the results.

5) The questionnaire was self-administered and completed on the employees' own time. More accurate results may have been obtained if the researcher had administered the questionnaire.
6) The questionnaire was lengthy, which may have discouraged participants from answering all questions in a thoughtful manner.
7) Analysis of the use of the salad bar, fruit station and beverage consumption for the beverage station may have produced more comprehensive results.

JUSTIFICATION

Increasing awareness of the importance of diet for health promotion and disease prevention has led to a greater concern about diet and food patterns of the American population (Melnik et al, 1998). Various institutions have established food consumption guidelines to assist consumers with the selection of foods to promote health and prevent disease. The US Department of agriculture (USDA) developed the Food Guide Pyramid (FGP) as a system to specifically guide selection and consumption of foods to meet the DGA for children and adults (Melnik et al., 1998).

Surveys have demonstrated the importance of diet and nutrition for the American population. For example, according to a public opinion survey released by the American Dietetic Association (ADA), 9 out of 10 Americans say that diet and nutrition are important to them, however less than half of all Americans are doing more to achieve a healthy diet (Rostler, 2002).

Restaurants and other foodservice outlets are important venues for nutrition programs promoting recommendations to reduce the fat intake content in menus (FitzPatrick et al, 1997). Canadian data show that consumers' utilization of

restaurants have increased from 27% to 32% in the last decade (FitzPatrick et al, 1997). In the United States (US) an even greater proportion of food dollars is spent in foodservice establishments, increasing from 39% to 46% in the last decade (FitzPatrick et al, 1997).

A 1997 Restaurant and institution analysis of seven top restaurant menu choices from 78 establishments found that only three fourths of the menus that were tested their healthful quality, met the criteria of no more than 30% of energy from fat and 10% of energy from saturated fat (Hurley et al., 1995). At the same time, higher nutrition awareness is leading to consumer demand for healthful alternatives in restaurants (Reichler et al, 1998). Customer satisfaction with menu items is important for several reasons. Firstly, customer satisfaction with a menu item translates into willingness to try that product again (FitzPatrick et al, 1997). Secondly, consumption of satisfying menu items that provide reinforcement of more healthful eating may influence customers' attitudes towards nutrition and effect a behavioral change (FitzPatrick et al, 1997).

The hospitality industry in the United States is very large and employs a large segment of the US population. Review of the literature (Reichler et al., 1998; FitzPatrick et al., 1997; Hurley et al., 1995) suggests that little research has been conducted on the nutritional quality of meals served in the employee cafeterias, which could reflect on the nutritional knowledge and practices of the chef and his/her staff. Respondents from restaurants serving foods that delivered more energy from fat than claimed, attributed the problem to cooks who did not follow recipes (Reichler et al., 1998).

The purposes of this study therefore were to investigate the nutritional quality of meals served in the EDR of the SNO, and employees' perception, attitude, behavior, and knowledge about nutrition. In addition, the chef at the SNO was interviewed to determine his knowledge of nutrition and attitudes toward the meals served to employees and customers of the SNO.

CHAPTER 2

REVIEW OF THE LITERATURE

Nutrition and dietary factors play important roles in health and chronic disease prevention (Kreb-Smith et al., 1997). The DGA and the FGP articulate this role and provide basic dietary guidance and practical food recommendations for the public (ADA position paper, 1998). Landmark reports such as the Surgeon General's Report on Nutrition and Health, Diet and Health; Implications for Reducing Chronic Disease Risk, and Dietary reference intakes (DRI) provide additional recommendations and population-based standards for optimal nutrition (Enns et al., 1997; Kant, 2000; Hubbard, 2000; Blackburn, 2001). The Healthy People 2010: National Health Promotion and Disease Prevention objectives document notes that up to 50% of chronic disease mortality is attributable to lifestyle factors that can be changed (Kant, 2000; Blackburn 2001; Hubbard, 2000). The Surgeon-General's report states, "For two out of three adult Americans who do not smoke and do not drink excessively, one personal choice seems to influence long-term health prospects more than any other: what we eat (The Surgeon General's Report on Nutrition and Health, 1988).

In the changing US health care environment, it is increasingly evident that preventive health care services emphasizing the role of diet, food choices, and physical activity are needed to reduce the cost of health care in traditional, public health, and managed care settings (Gerber et al., 2000; Kant, 2000; Blackburn, 2001; Hubbard, 2000. Increasing awareness of the importance of diet for health promotion and disease prevention has led to a greater concern about the diet and food consumption patterns of Americans (Melinik et al., 1998). The American Dietetic

Association (ADA) research (ADA Nutrition Trend Survey, 1997) revealed that 80% of Americans believe that nutrition can have a significant impact on health. Consequently, consumers are searching for information and guidance on how to eat for good health and good taste (Kreb et al., 1997).

More recently, the focus has turned to excess fat and energy in the diet as possible causes of chronic diseases. Recommendations from the American Heart Association, National Cancer Institute, the American Cancer Society, and the United States Department of Agriculture (USDA), have urged Americans to reduce the intake of excess fat and energy as important steps toward improving overall health (Bidlack, 1996). Epidemiologic studies of diet and chronic disease have focused on the relation between single-nutrient consumption and disease risk. The traditional approach has been to link the consumption of total fat (Holmes et al., 1999), saturated fat (Hu et al., 1999), protein (Hu et al., 1999), or alcohol (Garland et al., 1999) to the risk of coronary heart disease or cancer. However, most foods contain many nutrients, and intakes of one nutrient are often correlated with intakes of others (Kant, 1996). The single-nutrient approach does not allow for an examination of nutrient interactions and their combined effect on health outcomes (Hann et al., 2001).

Some investigators have shifted attention to the relation between consumption of individual foods and disease risk. The consumption of nuts (Hu et al., 1998), eggs (Hu et al., 1999), salad dressing (Hu et al., 1999), and brussel sprouts (Poppel et al., 1999) were examined in relation to the risk of cancer or coronary heart disease. However, diets are composed of many different foods, the single-food, like

the single-nutrient, approach does not account for the complexity of eating habits and does not reflect the multifaceted nature of human diet (Hann et al., 2001).

Nutrient bioavailability and absorption often depend on food preparation methods and eating patterns (Slattery et al., 1998; Hu et al., 1999). Choosing a variety of foods across and within food groups is thought to improve eating patterns by providing the vitamins, minerals, and other micronutrients required for optimum health. Many individual foods can fit into a healthful eating pattern, provided they are consumed in moderate amounts and are incorporated into a sufficiently varied diet. Increasing the variety of food choices shifts the focus from individual foods to the quality of the total diet. Dietary variety is therefore regarded as an integral component of healthful eating styles (Callaway, 1998).

A dominant nutritional message has been that diets high in complex carbohydrates promote good health (Willett, 1998). Prevailing dietary guidance for reducing the risk of chronic diseases promotes consumption of fruits, vegetables, and whole grain while limiting energy and fat intakes (Kant, 2000). Therefore, dietary guidance communicated to the US public has advocated reduced consumption of energy-dense, nutrient-poor (EDNP) foods containing fats, oils, and sugars; these foods constitute the tip of the Food Guide Pyramid (USDHHS, 1996; Healthy people 2010 review). Data from the second National Health and Nutrition Examination Survey (NHANES II) showed that EDNP foods rich in fat, oil, and sugar provided one-third of the total daily energy intake for adult Americans (Kant, 2000). A healthful diet should contain all of the required nutrients and sufficient calories to

balance energy expenditure and provide for growth and maintenance throughout the life cycle (Gilmore et al, 1998).

In an effort to measure how well American diets conform to the recommended healthy eating patterns, the USDA developed a measure of overall diet quality "The Healthy Eating Index" (HEI) (Kennedy et al., 1995). The HEI was intended as a basis for nutrition promotion activities and as the principal tool for monitoring changes in the diet quality of consumers over time (Kennedy et al., 1995). The HEI is a 100-point analytic tool designed to measure the degree to which a person's diet conforms to such dietary guidelines as the USDA/US Department of Health and Human Services Food Guide Pyramid (USDA, 1992), and the DGA (USDA/USDHHS, 1990). HEI scores, that were based on dietary balance, moderation, and variety (Variyam et al., 1998), were calculated for respondents in the 1989-1990 Continuing Survey of Food Intake by Individuals (CSFII) (Kennedy et al., 1995). The HEI was intended as a basis for nutrition promotion activities and as the principal tool for monitoring changes in the diet quality of consumers over time (Hann et al., 2001).

The field of diet quality is not free from controversy. A key question is whether the existing dietary guidelines describe an optimal diet (McCullough et al., 2000). Some researchers have failed to find an association between HEI scores, based on food-frequency questionnaires, and the risk of major chronic diseases in women (McCullough et al., 2000). Their conclusion was that adherence to dietary guidelines is of limited benefit in disease prevention (McCullough et al., 2000). Others have questioned the benefits of dietary variety, suggesting that more varied diets were responsible for higher obesity rates (McCrory et al., 1999).

DIETARY REFERENCE INTAKES (DRI)

The Food and Nutrition Board of the Institute of Medicine, in The National Academy of Sciences, (Food and Nutrition Board. Washington DC, 2001) has released four reports presenting dietary reference values for the intake of nutrients by Americans and Canadians. These reports are: a) Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride; b) Thiamin, Riboflavin, Niacin, Vitamin $B_{6,}$ Folate, Vitamin $B_{12,}$ Panthothenic acid, Biotin, and Choline; c) Vitamin C, Vitamin E, Selenium, and the Caortenoids; d) Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, and Zinc (Trumbo et al., 2001). The development of Dietary Reference Intakes (DRI) expands and replaces the series of Recommended Dietary Allowances (RDA), which have been published since 1941 by the Food and Nutrition Board of the National Academy of Sciences, and the Recommended Nutrient Intakes (RNI) of Canada. The last one of the older philosophy for RDA was published in 1989.

The DRI are reference values that are quantitative estimates of nutrient intakes to be used for planning and assessing diets for healthy people (Trumbo et al., 2001). They include RDA as goals for intake by individuals, but also present three new types of reference values. These are: Adequate Intake (AI), Tolerable Upper Intake Level (UL), and Estimated Average Requirement (EAR) (Trumbo et al., 2001). In the reports on reference intakes Adequate Intakes (AI), rather than RDA, were chosen for all nutrients for infants to the age of one year. Several nutrients have an AI for all ages. These include: calcium, vitamin D, fluoride, pantothenic acid, biotin, and choline, vitamin K, chromium, and manganese (Trumbo et al., 2001). Although the

evidence was reviewed, no quantitative recommended intakes were given for arsenic, nickel, silicon, boron or vanadium (Trumbo et al., 2001).

A critical point in reviewing recommendations for intake is to note the specific criterion or functional outcome that was used as the benchmark for adequacy. This is used to determine the EAR. The EAR is a daily nutrient intake value that is estimated to meet the requirements of half the healthy individuals in a group (Trumbo et al., 2001). For a single nutrient the criterion for setting the EAR may differ from one life stage group to another because the critical function or the risk of disease may be different (Wilkinson et al., 1997). When no or very poor data were available for a given life stage group, extrapolation was made from the EAR or AI set from another group based on explicit assumptions on relative requirements (Wilkinson et al., 1997).

A requirement is defined as the lowest continuing intake level of a nutrient that will maintain a defined level of nutriture in an individual. The chosen level of nutritional adequacy may differ for individuals at different life stages (Abrams et al., 1997). If the degree of absorption of the nutrient is unusually low on a chronic basis (e.g., because of very high fiber intakes), a higher intake level may be needed. (Herman-Giddens et al., 1997). If the primary source of a B vitamin is a supplement, a higher percentage of the vitamin may be absorbed and so a smaller intake level may be required (Herman-Giddens et al., 1997).

A second key question usually asked is “Adequate for what?” In some cases, a continuum of benefits may be ascribed to various levels of intake of the same nutrients. Thus each EAR is described in terms of selected criterion or criteria of

adequacy (Trumbo et al., 2001). For example, the EAR for vitamin A is based on maintaining a minimum store of vitamin A in hepatic tissue; a lower EAR would result if the criterion chosen to be used in Canada and the United States (US) had been night blindness (Trumbo et al., 2001). Iron requirements are based on maintaining minimal levels of iron stores, rather than the lower amounts needed to prevent anemia.

The RDA is the average daily intake level that is sufficient to meet the nutrient requirement of nearly all (97 to 98 percent) healthy individuals in a particular life stage and gender group (Trumbo et al., 2001). Thus, the EAR is used to determine the RDA. An AI is similar to the previous version of the RDA. It is defined as a recommended intake value based on observed or experimentally determined approximations or estimates of nutrient intake by a group (or groups) of healthy people that are assumed to be adequate (Trumbo et al., 2001). The DRI apply to a healthy population. The RDA and AI are levels of intake recommended for individuals (Trumbo et al, 2001). The scientific data for developing the DRI have essentially come from observational and experimental studies in humans, but sometimes, animal studies are used. After a thorough review of the scientific literature, attempts were made for the identification of clinical and functional indicators of nutritional adequacy for each nutrient for each life stage and gender group (Wilkinson et al., 1997). Several times no EAR was determined and thus no RDA resulted. Anything that might affect dietary requirements, such as an interaction with other nutrients and the bioavailability of the nutrient, was considered when relevant. For example, the effect of energy intake was considered for thiamine,

riboflavin, and niacin; the effect of protein intake was considered for vitamin B6 (Wilkinson et al., 1997). Because of the growing evidence that some B vitamins may prevent the occurance of developmental abnormalities and chronic degenerative and neoplastic diseases, special consideration was given to the possible use of such indicators as criteria for adequacy (Herman-Giddens et al., 1997).

Tolerable Upper Intake Levels (UL) have been established for nutrients for which data were available. The UL is defined as the highest level of daily nutrient intake that is likely to pose no risks of adverse health effects to almost all individuals in the general population (Yates et al., 1998; Trumbo et al., 2001). As intake increases above the UL, the risk of adverse effects increases. The adverse effects that identified and characterized these nutrients are listed in the reports. For vitamin K, arsenic, chromium, and silicon, there are insufficient data for developing a UL (Yates et al., 1998; Trumbo et al., 2001). No UL is available for many B vitamins as well. This does not mean that there is no potential for adverse effects resulting from high intakes from all sources; for example, arsenic in water is a known poison (Trumbo et al., 2001). Because of lack of suitable data; UL of many of the nutrients could not be established for infants. This signifies a need for data, and in its absence, food sources only are recommended (Trumbo et al., 2001).

B vitamins and Choline

The B vitamins and choline report focuses on the eight B complex vitamins thiamin, riboflavin, niacin, vitamin B6, folate, pantothenic acid, biotin, and choline. These water-soluble nutrients fall into two categories: those involved in the reactions

of intermediary metabolism related to energy production and redox status and those involved in the transfer of single-carbon units (Wilkinson et al., 1997).

Antioxidants

The antioxidants included carotenoids, vitamin C, vitamin E, and selenium. Blood concentrations of carotenoids are the best biological markers for consumption of fruits and vegetables (Nebeling et al., 1997). A large body of observational epidemiological evidence suggests that higher blood concentrations of ß-carotene and other carotenoids obtained from foods are associated with lower risk of several chronic diseases (Mosca et al., 1997). The one clear function of certain carotenoids that is firmly linked to a health outcome is the provitamin A activity of some dietary carotenoids (ß-carotene, and ß-cryptoxanthin) and their role in DRI for vitamin A (Nebeling et al., 1997). Although no DRI are proposed for ß-carotene or other carotenoids at the present time, existing recommendations for increased consumption of carotenoid rich fruits and vegetables are supported (Mosca et al., 1997).

Physiologically, Vitamin C functions as a water-soluble antioxidant by virtue of its high reducing power (Simon et al., 1998). To provide antioxidant protection, a RDA of 90 mg/day for adult men and 75 mg/day for adult women is set based on the vitamin C intake to maintain near maximal neutrophil concentration with minimal urinary excretion of ascorbates (Yony et al., 1997; Simon et al., 1998). Because smoking increases oxidative stress and metabolic turnover of vitamin C, the requirement for smokers is increased (Yong et al., 1997).

Vitamin E is thought to function primarily as a chain-breaking antioxidant that prevents the propagation of lipid peroxidation (Upston et al., 1999). Current dietary

patterns appear to provide sufficient vitamin E to prevent deficiency symptoms such as peripheral neuropathy (Yoshida et al., 1997). The RDA for both men and women is 15 mg of a-tocopherol (Upston et al., 1999). The RDA is based only on the a-tocopherol form of vitamin E, which represents a change from most recent recommendations (Swanson et al., 1998; Upston et al., 1999).

Selenium functions through selenoproteins, several of which are oxidant defense enzymes (Hayashi et al., 1999). The RDA for selenium is based on the amount needed to maximize synthesis of the selenoprotein glutathione peroxidase, as assessed by the plateau in the activity of the plasma isoform of this enzyme (Hayashi et al., 1999).

Calcium and Related Nutrients

The report focuses on five nutrients- calcium, phosphorus, magnesium, vitamin D and fluoride, all of which play a key role in the development and maintenance of bone, and other calcified tissues (Abrams et al., 1997). Ninety-nine percent of body calcium, 85% of body phosphorus, 50-60% of body magnesium, and 99% of body fluoride are found in bone or calcified tissues (Abrams et al., 1997). Vitamin D functions as the substrate for the synthesis of 1,25-dihydrooxyvitamin D, which is the active hormone necessary for the regulation of calcium and phosphorus homoestasis (Whiting et al., 1997).

The development and preservation of bone mass are key elements in the estimation of the needs for these five nutrients for the population of the US and Canada (Whiting et al., 1997). For the most part, however it is the functioning of

these in bone and teeth that provided the most convincing criteria on which to base the new DRI (Abrams et al., 1997).

Fluoride is the ionic form of fluorine, a halogen and the most electronegative of the elements of the periodic table (Trumbo et al., 2001). Owing to its high affinity for calcium, fluoride is mainly associated with calcified tissues (Frekanich, et al., 1997). Its ability to inhibit, and even reverse, the initiation and progression of dental caries is well known (Feskanich et al., 1997). It also has the unique ability to stimulate new bone formation (Feskanich et al., 1997), and as such, it has been used as an experimental drug for the treatment of osteoporosis (Feskanich et al., 1997). The absorption of fluoride from ingested toothpaste, whether added as sodium fluoride or monofluorophosphate is close to 100% (Pak et al., 1997; Feskanich et al., 1997.

Phosphorus is the element most commonly found in nature in its pentavalent form in combination with oxygen, as phosphate (PO_4^{3-}). Phosphorus (as phosphate) is an essential constituent of all known protoplasm; its content is quite uniform across most plant and animal tissues (Heaney, 1997). The actual function of dietary phosphorus is to support tissue growth (either during individual development or through pregnancy and lactation) and to replace excretory and dermal losses (Lemann, 1996). In both processes it is necessary to maintain a normal level of phosphorus in the extracellular fluid which would otherwise be depleted of its phosphorus by growth and excretion. On a mixed diet, net absorption of total phosphorus ranges from 55 to 70 percent in adults and 65 to 90 percent in infants and

children (Lemann et al., 1996). There is no evidence that this absorption efficiency varies with dietary intake.

Total body magnesium (Mg) content is approximately 25 g (1000 mmol), of which 50 to 60 percent resides in the bone in the normal adult (Trumbo et al., 2001). One-third of skeletal Mg is exchangeable, and it is this fraction that may serve as a reservoir for maintaining a normal extracellular Mg concentration (Heamey et al., 1997). The normal serum Mg concentration is 0.75 to 0.95 mmol/liter (1.8 to 2.3 mg/dl). Magnesium is a required cofactor for over 300 enzyme systems (Abrams et al., 1997). It is required for both anaerobic and aerobic energy generation and for glycolysis, either indirectly as a part of the Mg-Adenosine triphosphate (ATP) complex or directly as an enzyme activator (Abrams et al., 1997). Magnesium has been called "nature's physiological calcium channel blocker" (Abrams et al., 1997). During Mg depletion, intracellular calcium rises. High levels of dietary fiber from fruits, vegetables, and grains decrease Mg absorption and/or retention (Abrams et al., 1997; Siener and Hesse, 1995).

Vitamin D (calciferol), which comprises a group of fat-soluble seco-sterols that are found in very few foods naturally, is synthesized in the skin of vertebrates by the action of solar ultraviolet B radiation (Abrams et al., 1997). Vitamin D comes in many forms, but the two major physiologically relevant ones are vitamin D_2 (ergocalciferol) and vitamin D_3 (cholecalciferol) (Abrams et al., 1997). Vitamin D_2 originates from the yeast and plant sterol, ergosterol; vitamin D_3 originates from 7-dehydrocholesterol, a precursor of cholesterol, when synthesized in the skin (Abrams et al., 1997). Vitamin D's major biologic function in humans is to maintain serum

calcium and phosphorus concentrations within the normal range by enhancing the efficiency of the small intestine to absorb these minerals in the diet (Abrams et al., 1997; Shama, 1996). 1,25$(OH)_2$ D enhances the efficiency of intestinal calcium absorption along the entire small intestine, but primarily in the duodenum and jejunum (Abrams et al., 1997). 1,25$(OH)_2$ D also enhances dietary phosphorus absorption along the entire small intestine (Abrams et al., 1997). Diets high in fish, an exceptionally rich natural source of vitamin D (USDA, 1991) are considered higher in vitamin D. For most people, vitamin D intake from food and supplements is unlikely to exceed the UL.

Vitamins A, K and Trace Minerals

In the report, AIs for vitamin K, chromium, and manganese are proposed, with RDAs being provided for vitamin A, copper, iodine, iron, molybdenum, and zinc. Vitamin K functions as a coenzyme during the synthesis of the biologically active form of a number proteins involved in blood coagulation and bone metabolism Morimoto et al., 1998). Chromium potentiates the action of insulin in vivo and in vitro. Manganese is involved in the formation of bone and in amino acid, lipid, and carbohydrate metabolism (Trumbo et al., 2001). Vitamin A plays an important role in vision, bone growth, reproduction, cell division and cell differentiation. Vitamin A also helps the body regulate its immune system (Boileau et al., 1999).

Copper functions as a component of a number of metalloenzymes acting as oxidases to achieve the reduction of molecular oxygen (Olivares et al., 1998). Iodine is an essential component of the thyroid hormones that are involved in the regulation of various enzymes and metabolic processes (Dunn et al., 1998). Iron functions as a

component of a number of proteins, including enzymes and hemoglobin, the latter being important for the transport of oxygen to tissues throughout the body for metabolism (Stevens et al., 1998). Molybdenum functions as a cofactor for a limited number of enzymes in humans (Fred et al., 1999). Zinc functions as a component of various enzymes in the maintenance of the structural integrity of proteins and in the regulation of gene expression (Umeta et al., 2000).

QUESTIONNAIRE DEVELOPMENT

Survey research is the method of gathering data from respondents thought to be representative of some population, using an instrument composed of closed structure or open-ended items (Behling et al., 2000). This is perhaps the dominant form of data collection in the social sciences, providing for efficient collection of data over broad populations, amenable to administration in person, by telephone, and over the Internet (Gelman et al, 1998). Surveys can be a powerful and useful tool for collecting data on human characteristics, attitudes, thoughts, and behavior (Rea et al., 1997). Sometimes conducting a survey is the only available option for acquiring data necessary to answer an important research question (Rea et al., 1997; Frankfort-Nachmias, 1996). Developing a strong questionnaire is a fundamental aspect of any survey research project (Marsland et al., 2000). A well-structured and well-written questionnaire has the greatest likelihood of producing relevant results (Marsland et al., 2000). Prerequisite to crafting an effective questionnaire is understanding the research objectives (Rea et al., 1997). Conducting a thorough literature review of prior research on a topic is also an important prerequisite for conducting a survey (Rea et al., 1997; Doyle, 2001).

Questionnaire development is an iterative process of draft, review and comment, redraft, further review, and so forth, until a near final version is ready to be tested (Rea et al., 1997). Typically, after an introduction, which discloses the sponsorship of a survey, a survey begins with non-threatening items, which arouse interest (Doyle, 2001). The first questions should be clearly related to the announced purposes of the survey (not a background item). Some researchers (Rea et al., 1997; Arksey et al., 1999) recommend the second question be open-ended, to allow the respondent to "get into" the subject. Non-threatening background information questions (e.g., demographic information) should be posed early so these controls will be available if the respondent fatigues and does not answer all the later items (Rea et al., 1997; Tourangeau et al., 2000). The survey then proceeds to attitude questions, often sequencing from general and less threatening items towards more specific and more sensitive items. Sensitive background items, particularly the income item, are usually put at the end (Gelman et al., 1998). However, the more toward the end of the survey an item is, the lower its response rate is apt to be. Therefore, it is desirable to administer the survey with different orders so as to lessen the order/response bias (Gelman et al., 1998).

Pretesting is the next step for any new or substantially revised questionnaire. Pretesting also should address other question and questionnaire issues. Pretesting also can address coding and data analysis issues (Czaja et al., 1996). Thorough pretesting helps avoid costly mistakes and usually improves the validity, reliability, and utility of the data that will be collected (Rea et al., 1997; Dillman et al, 1994). Constructing code categories and coding responses to open-ended questions need to be examined.

Most field pretests can take one of two forms: declared and undeclared. In a declared pretest, respondents are told that at times during the interview they will be asked to do more than just answer the questions. While in an undeclared pretest, the interview is conducted in the same manner as intended in the study (Czaja et al., 1996).

Most field pretests are carried out with the target population using the procedures planned for the main study (Bolton et al., 1996). Generally, this includes conducting the pretest in the same geographic area as the main study and testing the intended sampling frame (Presser et al., 1994). The consensus among most researchers is to use experienced interviewers (Czaja & Blair, 1996; Fowler, 1993; Presser & Blair, 1994; DeMaio et al, 1996). The rationale is that experienced interviewers are better able to spot errors and identify problems. This is especially important when testing the sampling frame for completeness, errors, or missing information. Questions should be designed to yield information on the personal behavior of respondents (Tourangeau, et al., 2000). Non-behavioral question items, such as demographic characteristics, knowledge, attitudes, and opinions should explain, enhance, or otherwise provide more in depth understanding. (Tourangeau et al., 2000).

Survey studies rely on "self-report" data, that is they are dependent on participants to report truthfully and accurately their attitudes and characteristics (Rea et al., 1997; Doyle, 2001). This does not always happen. Survey studies are subject to well-known types of bias. For example, since respondents know they are being studied, and have at least some idea why, they may give their answers, either consciously or unconsciously, to show themselves in a better light or to conform to

the expectations of those who are studying them (Rea et al., 1997; (Tourangeau et al., 2000). In addition, when screening the population to find eligible respondents is required, it is important to determine or test the rates of eligibility and ineligibilty, and to estimate response rates for the main study. Encountering unexpectedly low eligibility and/or response rates during main data collection has a disastrous effect on the study time schedule and budget (Czaja, 1998). Before deciding on conducting a survey it is important to investigate available alternative methods and weigh their advantages and disadvantages in relation to the goals of the project (Frankfort-Nachmias, 1996).

If conducted properly, surveys can accurately represent the opinions and judgements of a population. However, this doesn't mean that these opinions are correct (Rea et al., 1997; Tourangeau et al., 2000). Although survey data can be used to influence decision-making and public policy, they cannot substitute for expert judgement and analysis Tourangeau et al., 2000).

DIETARY GUIDELINES FOR AMERICANS

The DGA are based on a preponderance of scientific and medical knowledge. In addition, each federal department is mandated to use the DGA in carrying out federal food, nutrition, and health programs (Public Law No 101-445, 7 USC 5341 (1990)). Each federal nutrition program in the US uses the Dietary Guidelines as one part of the nutrition standard (Johnson et al., 2000). Therefore every day the guidelines directly impact 21.4 million Americans receiving food stamps, 26 million children who participate in the school lunch program, 7 million children participating in the school breakfast program, and approximately 7.4 million women, infants, and

children receiving benefits under the Special Supplemental Program for Women, Infants, and Children (WIC) (Johnson et al., 2000). The FGP (Welsh et al., 1992), the most widely distributed and best-recognized nutrition education device ever produced in the US, is based in part on the DGA.

The National Nutrition Monitoring and Related Research Act of 1990 (FASEB, Spring Conference, 1995) mandated that the guidelines be reviewed by the USDA and the (HHS) every five years. Hence, in 1998 the secretaries of USDA and HHS appointed an 11-member committee to review the 1995 DGA and recommend what changes, if any, should be made in the 2000 guidelines. The Dietary Guidelines Advisory Committee (DGAC) was charged with answering the following question: "What should Americans eat to stay healthy?" The committee used focus groups, reviewed the peer-reviewed scientific literature, and found that substantial new knowledge was available, and agreed that revision of the 1995 guidelines was needed (Johnson et al., 2000; Geiger, 2001).

Major revisions were made in the presentation of the guidelines using three basic messages called ABCs: Aim for fitness, Build a healthy base, and Choose sensibly for good health (Johnson et al., 2000; Geiger, 2001). The committee recommended increasing the number of guidelines from 7 to 10, and believed the ABCs for good health would help organize the guidelines in a memorable and meaningful way. The guidelines are intended for healthy children (aged 2 years and older) and adults of any age (Johnson et al., 2000; Gieger, 2001).

Specific Recommended Guidelines

Aim for Fitness

Aim for a healthy weight: The change in this guideline was aimed at improving the clarity of the wording. The word “balance” in the 1995 guideline was interpreted by the focus group participants to mean that it was acceptable to be overweight as long as physical activity and energy intake were balanced. The word “improve” was construed by some to mean to increase weight and by others to mean decrease weight (Dietary Guidelines for Americans Focus Group Study Final Report, 1998). The committee combined the message in the new guidelines into one actionable phrase.

The new guideline contains easy-to-use information on how to evaluate body weight. This includes a nomogram to simply calculate body mass index (BMI) and gives instructions on how to measure waist circumference. Using the 1998 National Institute of Health National Heart, Lung, and Blood guidelines for the identification, evaluation, and treatment of overweight and obesity, consumers are guided through a process of using their BMI, waist circumference, and other risk factors to determine if they are at a healthy weight (USDHHS, 1998).

Although the evidence that overweight and obesity lead to adverse health outcomes is indisputable (National Institute of Diabetes and Digestive and Kidney Diseases, 2000), there is less agreement about the management of obesity. This is especially true with regard to whether the emphasis should be on weight maintenance or weight loss. The DGAC recommended that if people are overweight, they should aim for a loss of about 10% of their weight over 6 months. This is based on evidence

that weight reductions of 5% to 15% reduce risk factors for the obesity-associated conditions (Bell et al., 1998), and that people's initial goal should be to lose 10% of their weight over a period of 6 months (USDHHS, 1998). Emphasis is placed on consumption of foods that are low in energy density as a means to control energy intake. This recommendation is based on a group of studies that demonstrated that the energy density of foods plays a role in daily energy consumption (Bell et al., 1998; Roll et al., 1998; Stubbs et al., 1995). Hence, consumers are urged to make grain (especially whole grain), fruits, and vegetables the mainstays of their diet. People are urged to choose sensible portion sizes and cautioned that if a food is labeled low-fat, it does not necessarily mean that the food is low in energy (Johnson et al., 2000).

Be physically active each day: A new guideline on physical activity was added because the benefits of physical activity go well beyond energy balance and weight management (Pate et al., 1995). Over the past 5 years, 9 national position papers of reports have been published documenting the importance of moderate physical activity for good health (USDHHS, 1997; Mazzeo et al., 1998; Pollock et al., 1998; Healthy People 2010 objectives, 1998). These reports indicate that being physically active for 30 to 45 minutes per day reduces the risk of developing heart disease, hypertension, colon cancer, and type 2 diabetes mellitus. Hence, improvements in physical activity levels are needed in every age group. The committee followed standards supported by the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (Pate et al., 1995) and recommended that adults be physically active at least 30 minutes most days

(preferably all days of the week). Children are urged to be physically active at least 60 minute per day (Biddle et al., 1998).

Build a Healthy Base

Let the Pyramid guide your food choices: The wording of the 1995 guideline "Eat a variety of foods" was changed to the new wording based on three lines of evidence. The first critical concept conveyed by this guideline is nutritional adequacy. Choosing foods from all the Pyramid food groups improves nutrient adequacy (Kant, 2000; Johnson et al., 2000). The second issue was that guidance to consume a variety of foods might promote overconsumption of energy. A limited number of controlled feeding studies demonstrated that more food is eaten at a meal if a variety of foods are available than if the selection is more limited (Johnson et al., 2000; Kant, 2000; Mazzeo et al., 1998). In addition, a 1999 analysis of nationwide consumption data suggested that a wide variety of sweets, snacks, condiments, entrees, and carbohydrates, coupled with a small variety of vegetables, was positively associated with increased energy intakes and body fatness (McCroy et al., 1999).

The last consideration was that the 1995 guidelines were unclear to consumers. Focus group participants responded that variety in the 1995 guideline was too vague to guide consumers to take specific actions. There was no definition of variety, or of a desirable level of variety (Dietary Guidelines for Americans Focus Group Final Report, 1998). They also respondents stated that the FGP was the most useful part of the DGA (USDA, 1999). Revised wording stressing the FGP better reflected the goal of the guideline.

Choose a variety of fruits and vegetables: Very few Americans meet intake recommendations for these two food groups (Johnson et al., 2000). Fruits are purposely listed before vegetables because fewer people meet the recommended intake of fruits. The revised wording of this guideline focuses on the importance of variety within the fruit and vegetable groups and avoids the use of the word "diet" which many consumers considered to be suggestive of restrictions (USDA, 1999). Keep food safe to eat: This guideline was added because it promotes actionable measures that can be taken by consumers and public officials to keep Americans healthy. The 1995 guidelines did not mention food safety (Johnson et al., 2000). The proposed new guideline covers the following topics: a) healthful eating requires that food be safe, b) foodborne illness is a major preventable public-health problem in the US, and c) consumers can apply simple food-handling practices to minimize their risk of foodborne illness (Dietary Guidelines for Americans Focus Group Final Report, 1998).

Choose Sensibly

Choose a diet low in saturated fat and cholesterol and moderate in total fat: The wording of this guideline was changed from the 1995 guideline to emphasize the importance of reducing intake of saturated fat and cholesterol (Johnson et al., 2000). There is evidence that diets high in saturated fat and cholesterol contribute to the development of coronary heart disease (Johnson et al., 2000). It is now well accepted that lowering serum LDL cholesterol levels will reduce the risk for coronary heart disease ((Gould et al., 1998). The guideline text also emphasizes the importance of reducing trans fatty acid intake. Trans fatty acids are included because of an

impressive body of evidence indicating that they raise serum LDL cholesterol levels as well as lower serum high density lipoprotein (HDL) cholesterol (Johnson et al., 2000).

An important change in this guideline is the placement of total fat after saturated fat and cholesterol. In addition, the wording recommends a diet termed "moderate" in total fat (Dietary Guidelines for Americans Focus Group Final Report, 1998). Although the guideline continues to recommend a diet with 30% or less of energy from total fat, the committee believed the phrase "moderate in total fat" best reflects this concept (Anand et al., 1998; Johnson et al., 2000).

Emphasizing low-fat diets for weight control had left the erroneous impression that low-fat diets, without energy reductions, would lead to weight loss. This belief may have led to overconsumption of total energy (Johnson et al., 2000). In fact, although the percentage of fat in the US diet has fallen, total fat intake is not lower than in the recent past because of apparent increased intakes of energy (Anands et al., 1998).

The 2000 DGA emphasize that all the guidelines, including the fat guideline, apply to children beginning at age two years. Current recommendations for adults do not need to be modified for children who are two years of age or older. Studies support the safety for children of diets that are low in saturated fat and cholesterol and moderate in total fat, as long as energy needs are met (Lauer et al., 1996; Niinikoski et al., 1997; Obarzanek et al., 1997).

Choose beverages and foods to moderate your intake of sugars: The Dietary Guideline for sugars emphasizes moderating the intake of sugars for two reasons.

First, focus group research indicated that consumers understand the word "moderate" to mean some but not too much (USDA, 1999). This in fact, is the intent of the guideline. Second, the concept of a moderate intake is consistent with the theme of moderation in the fat and alcohol guidelines (Johnson et al., 2000). The principal diet and health association for the sugars guideline continues to be dental caries. The DGAC report emphasized that there is no compelling evidence that sugars affect children's behavior. In addition, there is little evidence linking sugars with the etiology of type 2 diabetes mellitus. Finally, there is little evidence that diets high in sugars are associated with obesity (Johnson et al., 2000). However, this lack of association may be confounded by the pervasive problem of underreporting of food intake (Johnson et al., 2000).

For the first time, however, the word "beverages" was added to the wording of the 2000 guidelines to emphasize that they are a major source of sugars in the US diet. There is also discussion in the text distinguishing added sugar from naturally occurring sugars (Johnson et al., 2000). This was done because focus group participants found it confusing when the 1995 guideline promoted the consumption of fruits and low-fat dairy products, which are high in naturally occurring sugars fructose and lactose, while at the same time promoting a diet moderate in sugar (Johnson et al., 2000). Added sugars are defined as all sugars used as ingredients in processed and prepared foods such as bread, cake, soft drinks, jam, and ice cream, as well as sugars eaten separately. Sugars occurring naturally in foods such as fruits and milk are excluded (Cleveland et al., 1997). The most important source of added sugars in the American diet is non-diet soft drinks, which account for one third of all

intake of added sugars (Guthrie et al, 2000). Non-diet soft drinks, sugars and sweets (such as candies), sweetened grains (cakes, cookies, pies), fruit and fruit drinks, flavored milk and other sweetened milk products (ice cream) provide more than three fourths of the total intake of added sugars (Guthrie et al., 2000). Soft drink consumption is associated with intakes of calcium-rich beverages, such as milk (Skinner et al., 1999). Hence, the guideline text cautions consumers not to let soft drinks or other sweets crowd out other foods needed to maintain health, such as low-fat milk or other sources of calcium (Johnson et al., 2000).

Choose and prepare foods with less salt: The intent of this guideline is unchanged from the 1995 guideline. However, the new wording is framed in terms of choosing foods rather than a diet (Johnson et al., 2000). This is meant to convey a clearer meaning and to avoid the erroneous interpretation that the guidelines refer to either prescribed "special diets" or to weight-reduction diets. Reference to food preparation ("choose and prepare foods") was proposed to highlight the particular importance of food preparation practices in determining the sodium content of foods (Johnson et al., 2000). "Less" is substituted for "moderate" because of its greater clarity for consumers who find the term "moderate" difficult to interpret. "Sodium" was dropped from the guideline for simplicity; salt is the more familiar term (Johnson et al., 2000).

If you drink alcoholic beverages, do so in moderation: The committee recommended retaining the 1995 wording of the guideline. The text now places more emphasis on the adverse effects of excess alcohol intake and adds information on the increased risk of breast cancer associated with alcohol intake (Johnson et al., 2000).

Moderate drinking is clearly defined as one drink per day for women and two drinks per day for men. The text is reworded to make it clear that the different limits are based on gender, metabolism and body size. The guideline strengthens the language concerning pregnant women by saying "women who may become pregnant or who are pregnant" should not drink (Johnson et al., 2000).

The principal benefit of moderate alcohol intake is the lowered risk of cardiovascular disease. However, the text now clarifies that this benefit occurs mainly in men older than age 45 and women older than age 55 (Johnson et al., 2000). Moderate consumption provides little, if any, benefit to younger people. This age specificity is based on the age- and sex-specific rates of coronary heart disease (National Center for Health Statistics, 1999) and on the age-specific relative risks related to moderate alcohol consumption obtained from the prospective cohort studies of men and women in the US (Fuch et al., 1995; Thun et al., 1997).

PERCEPTION OF A HEALTHY MEAL

The USDA is the public leader in providing research and information to promote healthy eating. Promoting healthful diets is encapsulated in the DGA and the Food Guide Pyramid (Variyam et al, 1998). For most people, such nutrition advice focuses on eating less of some foods and dietary components (such as sweets, sugars, refined grains, and saturated fat), and more of others (such as fruit and dark green leafy vegetables). Although consumption patterns are changing slowly, many Americans, including children, are not meeting dietary recommendations. For example, people eat only about half the recommended amount of fruit, and some children have low calcium and iron intake (Maher et al., 1996). Unfortunately, many

people find that adopting and sustaining new eating habits is difficult, even with proper nutrition knowledge (Maher et al., 1996).

Eating patterns are important indicators of the nutrition status of the US population. Nutrition status is in turn associated with a number of health conditions known to be important determinants of mortality and morbidity in the population and it influences the capacity of humans to perform and their physical and psychological well-being (Marlett et al., 1997). Most Americans believe that the kind of food they eat is more important for managing weight than the amount of food they eat (Marlett et al., 1997; Weldon et al., 2000). A survey commissioned by the American Institute for Cancer Research (AICR), found that 78% of respondents said eating certain types of food while avoiding others was more central to their weight management efforts than eating less food (Weldon et al., 2000). This finding challenges nutrition experts, who have long suspected that messages about "low fat" eating may cause the public to lose sight of a more pressing concern: total energy intake (Weldon et al., 2000). The AICR survey suggests that Americans are seizing on "quick-fix" strategies with little regard for how much food they actually consume. Americans are concentrating too much on cutting fat, or going on fad diets that restrict carbohydrates or sugar, or some other factor (Weldon et al., 2000). Too often, such strategies fail to address the larger picture of total calories consumed, not to mention good nutrition.

Often, over-simplification of nutrition science leads to confusion. Years of nutrition messages regarding dietary fat, for example have led to decades of low-fat dieting and food manufacturing practices which have, in many cases, simply led to a replacement of fat with sugar (Variyam et al, 1998). At the same time, many

consumers are becoming familiar with the different types of fat and the effects these nutrients have on human health. Dietary fat supplies essential fatty acids, such as linoleic and linolenic acids, which once again, are especially important to children for proper growth. Fat is required for maintaining healthy skin, regulating cholesterol metabolism and as a precursor of prostaglandins, hormone-like substances that regulate many body processes (IFIC review, 1998).

In the era of low-carbohydrate dieting, information about foods that contain carbohydrate has led to confusion and inaccurate perceptions (Variyam et al, 1998). A 1996 survey by New York University and the center for Science in the Public Interest found that trained dietitians underestimated the energy content of five restaurant meals by an average of 37% and the fat content by 49% (Variyam et al, 1998). If nutrition experts have difficulty assessing the nutrients in their diets, the general public will likely have even more problems in assessing their diets.

The Tufts Longitudinal Health Study (TLHS), demonstrated that eating habits established during college, indicated that one-third of those studied eliminated red meat from their diet. However, the study's findings show that avoiding red meat does not necessarily translate to a better health profile (Economos et al., 2001). Specifically, low density lipoproteins (LDL) levels among non-red meat eaters were no lower than those in red meat eaters. Those who did eat red meat were more likely to meet more of their recommended dietary allowance (RDA) for protein and vitamin B_{12}. One in four students of the red meat eaters did not meet the RDA for iron and zinc (Economos et al., 2001). Non-meat eaters may be thinking erroneously that they are on a pathway to better health. Many people who avoid foods they perceive to be

high in fat, such as red meat, end up overloading on carbohydrates, baked goods and high fat dairy products, all of which may contribute to more weight gain than meat, and elevated cholesterol levels, both of which are risk factors for heart disease (Economos et al., 2001).

Of 33% of the college students who indicated that they are vegetarians, a majority eliminated only red meat from their diets. In fact, two thirds of them say they still eat chicken and fish (Economos et al., 2001). The USDA's 1989-1990 Continuing Survey of Food intakes by Individuals (CSFII) and the Diet and Health Knowledge Survey (DHKS) have been used to examine people's perceptions of their dietary intakes as compared with their actual intakes measured with 24-hour dietary recalls (Variyam et al, 1998). The results of this study indicated that 40% of household meal planners/preparers were dietary optimists, who rated their diet quality to be better that it actually was (Variyam et al, 1998). The same proportion were dietary realists who accurately predicted their diet quality. The remaining 20% were dietary pessimists, who perceived their diet quality to be worse than it actually was (Variyam et al, 1998).

These findings highlight the challenges facing successful implementation of nutrition guidance policies that strive to ensure that all Americans have access to an adequate, safe, and nutritious diet, and that they have the needed information to make informed food choices (Peterson, 1999). From a nutrition guidance perspective, people who have poor diets but who believe their intake to be healthful, present a special area of concern (Variyam et al, 1998). They may be unaware that their current

nutritional intake could be detrimental to their health, and there is no reason to expect them to change their eating habits without further intervention. (Variyam et al, 2000).

The realists (i.e. those who correctly assessed their diets) were comprised of 33% who had diets that were poor or needed improvement, and 7% who had diets that were of good nutritional quality (Variyam et al, 1998). The realists with poor diets raise questions about what would motivate them to change their eating habits. Many considerations, not just the nutritional value of food, affect dietary choices (Variyam et al, 1998). These consumers might be more responsive to nutritional guidance that alters their perception of what "healthy eating" entails by addressing their concerns about the convenience, affordability, and flavor of healthier diets (Variyam et al, 1998).

Persuading realists with poor diets to change their eating habits could prove to be financially costly. The members of this group were already aware that their diet quality does not meet the recommendations of the USDA's FGP and DGA and were perhaps reluctant to do anything about it (Variyam et al, 1998). Alternatively, the optimists might be willing to eat more healthfully if they realized their dietary misperceptions, and then might be more receptive to nutritional advice (Variyam et al, 1998).

The likelihood of household meal planners/preparers being falsely optimistic about their diet quality is associated with their socio-demographic profiles (Variyam et al, 1998; Nayga, 1997). A greater share of men tend to be optimists compared with women. The youngest (ages 18-25) and the oldest (66 and older) age groups were less prone to misjudge their diet quality compared with adults ages 26-45 (Variyam et al,

1998; Abdel-Ghany et al, 1997). The difference in dietary misconception is minor among Hispanics, non-Hispanic Whites, and non-Hispanic Blacks (Variyam et al, 1998).

The tendency to overestimate diet quality increases with the level of household income and the level of educational attainment (Variyam et al 1998). The strongest association of false optimism about diet quality is with the individuals's own perceived health status. Those who believe that they are in excellent health tend to view their diet quality as good when in fact it may not be (Variyam et al, 1998).

DIETARY QUALITY

Serving quality food is a goal of all food service establishments. Quality food may be defined as food that is selected, prepared, and served in a way so that it retains its natural flavor and identity, is nutritious, and is free from bacteriological, physical, or chemical contamination. Quality food also must be palatable, acceptable, attractive, and appealing to those consuming the foods (Drewnowski et al, 1996).

The definition of diet quality depends on attributes selected by the investigator. In the past, diets that met needs for nutrients, such as protein or selected vitamins and minerals, at a given level of energy intake may have been defined as 'quality'. Prevailing dietary guidance focuses on reducing the risk of chronic diseases. Thus dietary attributes associated with risk reduction are viewed as important quality indicators. A relatively low-fat diet that meets energy and nutrient needs or a low-fat diet with high fruit, vegetable, and grain intake also might be defined as high quality (Kant, 1996).

Single index nutrients may be defined as those that permit inferences to be drawn regarding the intake of other nutrients given the prevailing food supply and food selection practices in a population. Dietary energy, fat, and selected micronutrients have been used as indexes of overall nutrient adequacy by some investigators (Kant, 1996; Soler et al, 1998; Pietinen et al, 1996).

Global indicators of dietary quality are viewed as a method to account for the numerous possible dimensions of diet related disease risks as well as the interrelations among them. In addition, these indices are presumed to capture the net effects of the food choices consumers make when following the wide array of nutritional advice they receive. Free-living people, however, do not consume single foods but combinations of several foods that contain both nutrient and non-nutrient substances (Gilmore, et al., 1998).

Considerable work has been done to develop a consensus on dietary recommendations for the prevention of chronic diseases based on epidemiologic studies (Gerber, et al., 2000). The predominant approach of these studies has been measurement of single dietary components. Few studies have estimated the relative risks of diseases using a composite index (Soler, et al., 1998).

CALORIE AND NUTRIENT INTAKE IN GROUPS

The USDA's Food guide Pyramid provides general guidance to help Americans choose what and how much to eat without excess energy or fat (Biing et al, 2002; Cleveland et al, 1997). The Pyramid specifies numbers of servings to eat daily from five major food groups (grain, vegetable, fruit, dairy, and meat) and gives advice about intakes of fat and added sugars (Biing et al, 2001; Cleveland et al,

1997). The recommended number of servings depends on the individual's energy needs, which in turn depends on the individual's age, sex, and activity level (Biing et al, 2001; Cleveland et al, 1997). Continuing Survey of Food Intake by Individuals 1994-96 data are the basis for food intake estimates. CSFII 1994-96 data are the only USDA survey data that contain Pyramid servings information (Biing et al, 2001). There are important differences in interpreting the recommended number of servings in relation to food energy (Biing et al, 2001). In the calculation of the HEI, the USDA's Center for Nutrition Policy and Promotion (CNPP) uses the Recommended Energy Allowance (REA) to determine the recommended number of servings (Biing et al, 2001). However, the USDA's Agricultural Research Service (ARS) uses the reported energy intake to determine the recommended number of servings (Biing et al, 2001). ARS uses 9 pyramid servings as the recommendation for those consuming 2200 or 2800 calories, while CNPP uses linear interpolation to calculate recommended servings (for example, 10 servings for 2500 calories) (Biing et al, 2001; Enns et al, 1997).

The Pyramid displays a range of servings for each major food group. (USDA, Center for Nutrition Studies, 2001; Enns et al, 1997). According to the Pyramid guidance, almost everyone should have at least the lowest number of servings in the ranges. One thousand six hundred calories is considered adequate for many sedentary women and some older adults. The recommendation for most children, teenage girls, active women, and many sedentary men is 2200 calories. Two thousand eight hundred calories is generally adequate for teenage boys, many active men, and some active women. Women who are pregnant or breastfeeding may need somewhat more

calories than is recommended for women (USDA, Center for Nutrition Studies, 2001; Enns et al, 1997). Preschool children need the same variety of foods as older family members do, but may need less than 1600 calories. The energy level suggestions are based on the recommendations of the National Academy of Sciences and on the energy intakes reported by people in national food consumption surveys. (USDA, Center for Nutrition Studies, 2001).

The DGA recommends that Americans limit fat in their diets to 30% of calories (USDA, Center for Nutrition Studies, 2001). This amounts to 53 grams of fat in a 1600-calorie diet, 73 grams of fat in a 2200-calorie diet, and 93 grams of fat in a 2800-calorie diet (USDA, Center for Nutrition Studies, 2001). An individual is likely to consume up to half of this fat even if the lowest fat choices from each food group are chosen, and no fat is used in food preparation or added at the table (USDA, Center for Nutrition Studies, 2001).

Different types of fat have different effects on health. Almost all fats in foods are mixtures of three types of fatty acids: saturated, monounsaturated, and polyunsaturated. Consuming too much saturated fat raises blood cholesterol levels in many people, increasing their risk for heart disease (Gatenby et al., 1997). The DGA recommends limiting saturated fat to less than 10% of calories or about one-third of total fat intake (USDA, Center for Nutrition Studies, 2001). Choosing a diet low in fat is a concern for many; choosing one low in added sugars is also important for those who have low energy needs. To control energy intake from sugars, added sugars should be limited to 6 teaspoons a day for a 1600 calories diet, 12 teaspoons at 2200 calories, and 18 teaspoons at 2800 calories (USDA, Center for Nutrition Studies,

2001; Enns et al, 1997). These amounts are intended to be averages over time, and are illustrations of healthful proportions in the diet, not rigid prescriptions (USDA, Center for Nutrition Studies, 2001; Enns et al, 1997).

Most people consume more salt than needed. Some health authorities and nutrition experts state that sodium intake should not exceed 2400 milligrams (mg) (USDA, Center for Nutrition Studies, 2001; Enns et al, 1997). Nutrition labels also list a Daily Value of 2400 mg per day of sodium. To limit sodium intake, foods that are high in sodium should be avoided. These include cured meats, luncheon meats, and many cheeses, most canned soups and vegetables, condiments such as ketchup, mayonnaise, mustard, and soy sauce (USDA, Center for Nutrition Studies, 2001; Enns et al, 1997).

Fruits and vegetables provide vitamins, such as ß-carotene and vitamin C, folate, and minerals such as iron, potassium and magnesium. They are low in fat and provide fiber (USDA, Center for Nutrition Studies, 2001; Enns et al, 1997). The Food Guide Pyramid suggests 3 to 5 servings of vegetables a day. Fruit and fruit juices provide important amounts of vitamin A and C and potassium. Fruits are low in sodium (USDA, Center for Nutrition Studies, 2001; Enns et al, 1997). The Food Guide Pyramid suggests 2 to 4 servings of fruit a day.

Milk products provide protein, vitamins, and minerals. Milk, yogurt, and cheese are the best source of calcium (USDA, Center for Nutrition Studies, 2001; Enns et al, 1997). The Food Guide Pyramid suggests 2 to 3 servings of milk, yogurt, and cheese a day (i.e. 2 for most people, and 3 for women who are pregnant or breastfeeding, teenagers, and young adults to the age of 24).

Adults who choose to drink alcoholic beverages should have no more than 1 drink (women) and 2 drinks (men) a day. Alcoholic beverages provide energy, but to all intent and purposes, no nutrients (USDA, Center for Nutrition Studies, 2001; Enns et al, 1997). However, very moderate consumption of alcoholic beverages does provide some healthy benefits (USDA, Center for Nutrition Studies, 2001), those prone to alcoholism should not drink alcohol at all.

KNOWLEDGE, ATTITUDE, AND PRACTICES (KAP) OF GROUPS

Conclusions can be drawn about the nutritional status of Americans by relating data on selected indicators of nutritional status to data on food consumption from two federal surveys: the Third National Health and Nutrition Examination Survey (NHANES III), conducted by the Department of Health and Human Services (DHSS), and the Nationwide Food Consumption Survey (NFCS), conducted by the USDA. The results of these surveys provide an opportunity to assess the US population's health and nutritional status and, by comparing the data with earlier surveys to learn how this status has changed over time. The USDA and Health and Human Services have released the Third Report on Nutrition Monitoring in the United States. It reviews and interprets data on the dietary, nutritional, and health-related status of the U.S. population, and factors that affect that status (USDHHS, Centers for Disease Control and Prevention, 2002). The report includes recent data and trends on nutrition and health; food and nutrient consumption; knowledge, attitude and behavior assessments; food composition and nutrient data-bases; and food supply determinants. The report profiles the nutritional status of Americans, in general, as well as groups at high risk of nutritional problems (USDHHS, Centers of Diseases Control and Prevention, 2002). Highlights of the report indicate that Americans

are slowly changing their eating patterns toward more healthful diets but, a considerable gap remains between public health recommendations and consumers' practices (USDHHS, Centers for Disease Control and Prevention, 2002).

A USDHHS, Centers for Disease Control and Prevention in 2002, uses health outcomes to indicate poor nutrition. Among these were overweight, high serum cholesterol levels and hypertension. About one-third of adults and one-fifth of adolescents in the United States are overweight (USDHHS, Centers for Disease Control and Prevention, 2002). This result is an increase in the prevalence of overweight since 1970 (USDHHS, Centers for Disease Control and Prevention, 2002). The same report also found that an increasing number of Americans, particularly those over age 55 are taking vitamin and mineral supplements. Forty-nine percent of adults said they take supplements every day, including 65% of those over age 55 and 34% of those between 25 and 34 years (Rostler, 2002). Despite significant educational initiatives to reduce blood serum cholesterol, 20% of Americans have high serum cholesterol levels. Hypertension remains a major public health problem in middle-aged and elderly people. Non-Hispanic blacks have a higher age-adjusted prevalence of hypertension than non-Hispanic whites and Mexican Americans (USDHHS, Centers for Disease Control and Prevention, 2002). This report thus highlights the need for better nutrition education for the general public.

The report also used nutrition goals to indicate that many Americans are not obtaining the calcium needed to maintain optimal bone health and prevent age-related bone loss, particularly adolescents, adult females, elderly people, and non-Hispanic black males (USDHHS Centers for Disease Control and Prevention, 2002). In

addition, less than one-third of American adults meet the recommendation to consume five or more servings of fruits and vegetables per day (USDHHS, Centers for Disease Control and Prevention, 2002).

Surveys used by the USDHHS in their report conclude that groups with the highest prevalences of impaired iron status were children aged 1 through 2 years, males aged 11 through 14 years, and females aged 15 through 44 years (Rosenberg et al., 1999; Kant, 2000). Dietary data from the NFCS (Mela et al., 1998) indicate that the groups with the highest prevalences of impaired iron status had the lowest intakes of iron as a percentage the RDA.

In recent years, interest in the vitamin C status of Americans has increased as evidence for the role of this vitamin in inhibiting the formation of some carcinogens has accumulated (Kant, 2000). Vitamin C containing foods are also associated with a lower risk of stomach and esophageal cancer (Kant, 2000). Diet, smoking habits, and other lifestyle factors affect serum vitamin C levels. The USDHHS survey findings reflected that very few children had low serum vitamin C levels, where low was defined as less than 0.25 mg/dl (Kant, 2000). The prevalence of low values generally increased for teenagers, and adult males had a higher proportion of low values (5.6%) than did females (2.7%). The mean serum vitamin C levels were significantly higher for regular supplement users (1.3-1.5 mg/day) than for irregular or nonusers (0.7-1.1 mg/day) for both males and females whether smokers or nonsmokers each category (Monsen, 2000).

TRENDS TOWARD HEALTHY EATING HABITS

Adequate nutrition is essential for growth and development, health, and well-being. Behaviors to promote health should start early in life and continue throughout the life cycle. Nutritional, or dietary factors contribute substantially to the burden of preventable illnesses and premature deaths in the United States (USDA, 1999). Dietary factors are associated with four of the ten leading causes of death: coronary heart disease (CHD), some types of cancer, stroke, and type 2 diabetes (NCHS, 1995). These health conditions are estimated to cost society over $200 billion each year in medical expenses and lost productivity (Frazao, 1996). Dietary factors also are associated with osteoporosis, which affects more than 25 million persons in the United States and is the major underlying cause of bone fractures in postmenopausal women (Finn, 1997).

Many dietary components contribute to the link between nutrition and health. Excess body fat is the largest nutrition-related problem in the US as well as other affluent countries (Willett, 1998). The USDHHS, Centers for Disease Control and Prevention, 2002 report concludes that low-income individuals tend to be overweight because higher energy non-nutrient dense foods are cheap (Mela, et al., 1998).

Undernutrition is a condition in which people lack the basic food intake necessary to provide them with the energy and nutrients for fully productive, active, and healthy lives. Overt malnutrition is not commonly observed in the United States. However, reports indicate an increase in insufficient food intake resulting from poverty and related problems that affect families and communities (Bales, 2001; USDHSS, Center for Disease Control and Prevention). Although some progress has

been made since 1970 in reducing the prevalence of iron deficiency among children from low-income families and pregnant women, much more needs to be done to improve the health of all children, as well as the health of pregnant women of childbearing age (Bales, 2001)

Since 1990, consumption of calcium-rich foods, such as milk products, has generally decreased and is especially low among teenaged girls and young women (Finn, 1997). Because sources of calcium include foods with naturally occurring calcium, calcium fortification and dietary supplements, the current emphasis is on tracking calcium intake from all sources (Finn, 1997).

Experts agree that breast cancer, osteoporosis, and heart disease have strong links to nutrition. In fact, nutrition research may improve the prevention and treatment of these diseases. In recent years there has been a concerted effort to increase the folic acid intake of females of childbearing age through fortification and the diet (Finn, 1997). Since research studies confirmed that taking folic acid during pregnancy helps prevent a variety of birth defects (Hernandez-Diaz et al., 2000). Folic acid is vital for cell growth and function and for making DNA, the building block of the genetic code (Hernandez-Diaz et al., 2000).

In the US, there has been an alarming increase in the number of overweight and obese persons (Lewis, et al., 1998). Overweight results when a person obtains more energy from food than is expended. This balance between energy intake and output is influenced by metabolic and genetic factors, behaviors affecting dietary intake, and physical activity. In addition, environmental, cultural, and socioeconomic components play a role excessive weight gain (Biing et al, 2001; Enns et al, 1997).

A major shift in consumer thinking about food has occurred in the past decade. The ADA's 1993 survey of America Dietary Habits (Palmer et al., 1995), found that 82% of Americans rate nutrition as moderately to very important, 69% rated nutrition as important because of health concerns, and 83% recognized that what they eat might affect their future health. Fifty-six percent of the respondents worried about the fat and cholesterol content of the food they eat, while 35% did not know the difference between dietary cholesterol and blood cholesterol (Drewnowski et al., 1996). Responses about the Dietary Guidelines indicated that the respondents wanted more specific food related guidance, definitions of technical terms, and practical strategies for changing behavior (Drewnowski, et al., 1996).

Increased knowledge about nutrition and technological advances in food science have enhanced the development of an abundant, nutritious, safe food supply in the US (Kant, 1996). These advances have enabled the modification of existing foods to offer greater nutritional density or improved functional ingredients (Drewnowski et al., 1996). Policies to improve healthcare require integration of nutrition care and education and consideration of the effect of changing lifestyle, and food choices (Drewnowski et al., 1996).

The National Restaurant Association reports that on a typical day, almost one-half of adults eat in a food service establishment and 44% of all food dollars are spent in food service establishments. The increased eating away from home behavior places more responsibility for offering healthful foods on food service operators (Drewnowski et al, 1997). Food service operators are constantly challenged to meet the needs of customers. Cafeteria-based nutrition programs are one of the most

popular worksite nutrition intervention approaches and could become a more sophisticated and fundamental component of worksite nutrition in the future (Fitzpatrick et al., 1997). Environmental and cultural strategies could become integral to the overall design of worksite nutrition programs in the future. Another approach that has been introduced recently is the introduction of catering policies that establish nutrition standards for food provided to customers through caterers (Fitzpatrick et al., 1997). The trend toward health and fitness, and the link between nutrition and health have prompted food service operations to provide more healthful alternatives (Fitzpatrick et al., 1997).

NUTRITION, CULINARY TRAINING, AND FOOD TREATMENT

Healthy People 2010 is a national health promotion and disease prevention initiative that brings together national, state, and local government agencies; nonprofit, voluntary, and professional organizations; businesses; communities; and individuals to improve the health of all Americans, eliminate disparities in health, and improve years and quality of healthy life (www.health.gov/healthy people). One Healthy People 2010 objective is to increase the proportion of restaurants and institutional food service operations that offer identifiable low-fat, low-calorie food choices, consistent with the DGA, provides impetus for targeting chefs with ways to create healthful meals (Palmer et al, 1995).

The food environment, including restaurants, influence consumer choices (Palmer, et al., 1995). The availability, accessibility, and relatively low cost of unhealthful consumer products are important enabling factors that adversely affect health behavior in the US today (Palmer et al, 1995; Enns et al, 1997). However,

interventions that focus on increasing choices in cafeterias and restaurants by adding healthful items or labeling foods, have had mixed results (Palmer et al, 1995). A combination of new healthful items, energy labeling, and incentives in a worksite cafeteria increased the sales of healthful items (Palmer et al, 1995; Alfieri, 1997). Conversely, increasing the availability of healthier snacks in vending machines on a college campus did not result in increased sales, even when the healthier snacks were labeled as such (Palmer et al, 1995). Other techniques used to encourage patrons to choose healthier food items, including incentives, informational brochures, questionnaires, and games, have had varying results (Palmer et al, 1995; Alfieri et al, 1997). Thus the availability of healthful foods may not be enough to influence consumers to choose healthier items.

Taste exerts a powerful influence on consumer food choice. To be accepted, healthful items must taste good (Palmer et al, 1995; Borrud et al, 1996). Commercial establishments regularly report difficulty in satisfying ambivalent consumers who say they are interested in healthful restaurant items, but make taste the most important issue when ordering (Palmer et al, 1995). Certain experts believe that since taste is the most important attribute in consumer choice, the food service industry should promote taste first and nutrition second (Palmer et al, 1995). Segments of the restaurant industry have responded to consumers' desire to healthier food choices by marketing products that are more nutritious but maintain the taste of the traditional item (Palmer et al, 1995; Borrud et al, 1996).

Most point-of-purchase nutrition education programs target the restaurant patron (Palmer et al, 1995). Chefs also are an important audience that should be

targeted. Some programs, such as the AHA, provide low-fat recipes or guidelines for chefs, but few focus directly on education (Palmer et al, 1995). A 1995 study (Palmer et al, 1995) to evaluate the talent and creativity of chefs presented six weeks of classes on developing healthful menus with pleasing taste. Results indicated that the ability of chefs to develop healthful and tasteful menus was greatly enhanced. One chef was able to reduce fat in a restaurant menu from 57% to 30% without the clientele discerning any change (Palmer et al, 1995). A follow up survey of the participants indicated that the chefs had no negative attitudes about nutrition, put more healthy food choices on menus, and increased their effort to provide low fat food items. They also indicated that the classes made them much more aware of fat sources in food (Palmer et al, 1995). Therefore efforts should continue to educate chefs to change the nutrition environment (Palmer et al, 1995).

CHAPTER 3

SUBJECTS AND METHODS

This study was conducted to assess the nutritional quality of the meals served in the employee dining room (EDR) of the Sheraton New Orleans hotel (SNO) and to determine employees' perception of the nutritional quality of their meals. The Director of Human Resources and the Executive Chef of the SNO, respectively, granted permission to conduct this study in the hotel.

INSTITUTIONAL REVIEW BOARD APPROVAL

Approval by the Louisiana State University (LSU) and the Agricultural and Mechanical College (A&M) Institutional Review Board (IRB) was sought and received before beginning the study.

COVER PAGE

A cover page with instructions (Appendix B) was attached to the questionnaire (Appendix D). Participants were instructed to complete the questionnaire on their own time and return them to the mail-box located on the executive floor of the SNO by March 31st, 2000. To maintain anonymity of study participants, they were instructed in writing to omit their name from the questionnaire.

SUBJECTS AND SAMPLING

The criteria for participation in the study were:

1) Full time employees of the SNO, employed by the SNO for at least six months.
2) Full time employees who consumed at least one of their meals in the Employee Dining Room (EDR) of the SNO when at work.

CONSENT FORM

A consent form (Appendix C) providing written information on the objectives of this study, its main purpose, and the future use of the results was attached to the questionnaires. Signatures by both the participant and the researcher demonstrated informed consent.

QUESTIONNAIRE DESIGN

A 61-question nutritional behavior, knowledge, and attitude questionnaire that elicited demographic information (i.e. sex, age, race), and information on nutrition knowledge, attitudes, and behavior (KAB) was used. The questionnaire was divided into two parts. The first part was composed of questions eliciting Likert type scale responses and multiple-choice responses. The second portion contained questions requiring true/false, multiple choice, or yes/no type responses. Each part of the questionnaire had three sub-sections of questions on knowledge, attitudes, and behavior.

The questionnaire was pre-tested on twenty randomly selected full time employees of the SNO hotel for clarity and appropriateness of the questions. These employees made suggestions on the language, content and clarity of phrases and other terms used in developing the questionnaire. In coordination with the Measurements and Evaluation Department of Louisiana State University (LSU), the questionnaire was designed in the appropriate format for electronic scanning and basic analysis.

SURVEY ADMINISTRATION

The questionnaires were distributed to 300 SNO hotel employees from all 24 departments, to be completed after they had signed a written consent. The

questionnaires were distributed using the SNO departmental mailboxes located in the executive offices (i.e. administrative center of the SNO).

MENU DESIGN

The Chef of the SNO provided the twenty-day cycle menus for lunch and dinner, offered in the EDR, as well as the recipes used for their preparation. (see Appendix E). The menus were grouped into lunch and dinner categories. Most of the menus served offered the same starch and vegetables for both lunch and dinner, but a different protein entrée was offered for each meal.

A meal is composed of 2-3 servings of starch, 2-3 servings of protein, and 2-3 servings of vegetables, and costs the employee $1.00. A free salad and fruit bar is available and employees can help themselves if they so choose. Below is a sample of menu 5a and menu 7b (Appendix E).

Menu 5a

Fried Chicken
Macaroni & Cheese
Mixed Vegetables

Recipe 5a

Fried Chicken	**Macaroni & Cheese**	**Mixed Vegetables**
2-3lb chicken	1lb elbow macaroni	8 oz broccoli
8 oz flour	1 teaspoon salt	8 oz cauliflower
1 oz salt	4 oz whole milk	8 oz carrots
1oz black pepper	8 oz Cheddar cheese	4 oz green peas
½ garlic clove	1 teaspoon black pepper	4 oz onions
		4 oz bell pepper
		8 oz butter

Menu 7b

Blackened Catfish
RedBliss Mashed Potatoes
Zucchini squash

Recipe 7b

Blackened catfish	Mashed Red Potatoes	Zucchini Squash
5lb catfish	4lb red potatoes	2lb zucchini squash
1 teaspoon salt	8 oz butter	8 oz butter
1 teaspoon black pepper	1 teaspoon garlic	1 teaspoon salt
1 teaspoon cayenne pepper	16 oz whole milk	1 teaspoon white pepper
1 teaspoon basil	1 teaspoon salt	
½ teaspoon oregano	1 teaspoon white pepper	
1 teaspoon paprika		
8 oz salad oil		

NUTRITIONAL ANALYSIS OF MENUS

The menus were analyzed using Food Processor software version IV. Ingredients, amounts, and preparation techniques for each food item on the menus were entered into the nutrient analysis program to analyze for carbohydrate, protein, types of fat. The dietary fiber content, amount of calcium, iron, sodium, vitamin C, energy and their sources were also analyzed. The analyses focused on determining if the meals served in the EDR of the SNO met the DGA's food related recommendations, contained moderate amounts of fat, and contained adequate energy to maintain a healthy weight. For the purpose of analysis, lunch menus were indicated with the letter "a", and dinner menus were indicated with the letter "b".

INTERVIEW WITH THE EXECUTIVE CHEF OF THE SNO

A personal interview was conducted with the Executive Chef of the SNO after an initial outline of the questions was provided to him. The outline allowed him the

opportunity to review the menu planning strategies he uses when planning meals for the EDR. The interview was conducted in his office at the SNO, after a consent form explaining the objectives, purpose, and future use of the results of the study was signed by both the chef and the researcher.

The interview lasted approximately 60 minutes. The chef has been employed at the SNO hotel for the past two and a half years. He graduated from the Culinary Institute of America located in Hyde Park New York, where particular emphasis is placed on nutrition in their curricula. He has comprehensive experience in the culinary arts. After graduation he worked at the Waldorf Astoria and then the Radisson Hotels' chain. Subsequently, he became the Executive Sous Chef at Caesar's Palace in New Jersey. He was hired as SNO Hotel's Director of Culinary Services in 1997. His responsibilities include: coordinating and managing all food and beverage outlets (i.e. the banquets department, coffee breaks department, room service department, Café Promenade restaurant, Pelican bar, employee dining room, and Starbucks coffee shop) in the SNO. The Chef also manages the financial accounts for all food and beverage outlets to ensure profitability and reduce waste.

The questions focused on:

1) The nutritional knowledge of the chef and his staff.
2) The chef and his staff's perception of a healthful diet.
3) Menu planning strategies used by the chef.
4) Factors influencing the chef's menu planning.
5) The nutritional knowledge of the SNO employees under the supervision of the chef.

Below are the questions asked to the chef during the interview:

1) How would you describe a healthful diet?

2) How would you describe the nutritional knowledge of your chefs and cooks?

3) Does your knowledge of nutrition influence your planning of menus for your customers?

4) What factors influence planning menus for your employees?

5) How would you characterize, the nutritional knowledge of your employees?

6) How would you describe the nutritional quality of the meals served in the employee dining room?

7) What is your attitude towards nutrition in general?

8) As a chef, do you think it is important to:

a) provide a vegetarian selection on your menu?

b) provide more fruit and vegetable selections as part of your menu offerings?

c) use lean beef and pork, and trim excess fat from poultry?

d) moderate the use of processed foods?

e) increase the use of grains, rice, and legumes in meal preparation?

f) use only moderate amounts of salt in cooking?

9) What is your understanding of the US Dietary Guidelines?

DATA ANALYSIS

A criteria of carbohydrates 55%; protein 20%; and fat 30% (Riccardi et al., 2000; Grimm et al., 1999; Macdonald et al., 1999), as defined by the USDA. The dietary fiber content, amount of calcium, iron, vitamin C, and sodium were compared to with the 1989 RDA, since at the time this study was started, the 2000 DRI was not yet published. Descriptive

statistics were calculated for demographic information and survey question responses. The Statistical Analytical Systems (SAS) software was used to determine if the carbohydrate, fat, and proteins of the menus served in the EDR followed the recommendations of the DGA and the Food Guide Pyramid. SAS was used to determine the levels of monounsaturated, polyunsaturated, and saturated fat in the meals served in the SNO hotel. The mean values of the results of all the analyses above were then presented in tabular form.

CHAPTER 4

RESULTS

DEMOGRAPHIC INFORMATION ON SURVEY PARTICIPANTS

There was a response rate of 38% (115) was achieved. Twenty nine percent of the participants in this survey were male, and 71% female. Fifty-five percent were African American, 40% were Caucasian Americans, and 5% were other. (Table 1).

Forty three percent of the respondents had been with the SNO for ten years or more, 28% between five and ten years, 22% between one and five years, and 6% between six months and one year. Fifty nine percent of the respondents were 31 years or older, 26% were between 26-30 years old, 11% were between 22-26 years old, and 3% were 21 years of age or under.

NUTRITIONAL ANALYSIS

Results of analysis of the nutrient content of the lunch and dinner menus are shown in Tables 2 and 3.

The results indicated that the average energy per serving of each lunch meal was 657 kilocalories ±52.23 standard deviation (SD) (Table 2). The average protein content of the lunch menus was 32 grams, 19% of the total energy content of the lunch menus, the carbohydrate content was 84 grams, 51% of the total energy content of the lunch menus, and the fat content was 30 grams, 21% of the total energy of the lunch menus. The cholesterol content of lunch menus was averaged 124 mg ±104.68 SD. The lunch menus contained an average of 12% saturated fatty acids (SFA), 4% polyunsaturated fatty acids (PUFA), and 9% monounsaturated fatty acids (MUFA) (Table 4). Twelve lunch menus had saturated fatty acid contents within the

recommended range of 7%-10%, nineteen lunch menus had polyunsaturated fatty acid content within the recommended range of 0-10%, and six lunch menus had monounsaturated fatty acid content within the recommended range of 10-15% (Table 5). Sixteen lunch menus had protein content of less than 20%, seventeen had carbohydrate content of greater than or equal to 45%, and thirteen lunch menus had a fat content of less than or equal to 30% (Table 4). The average dietary fiber content of the lunch menus was 6 gm, the calcium content 134 mg, iron content 4 mg, sodium content 1319 mg, and vitamin C content 27 mg (Table2).

Table 1. Demographic characteristics of survey participants

Characteristic	Number of respondents	% of total sample
Gender		
Male	33	29
Female	82	71
Race		
African Americans	63	55
Caucasians	46	40
Other	6	5
Years with SNO		
1-6 months	2	2
7-12 months	5	5
1-5 years	24	22
6-10 years	31	28
More than 10 years	47	43
Educational level		
University graduates	39	34
Community college graduates	41	37
High School graduates	35	30

LUNCH MENUS

Table 2. Nutrient content of lunch menus.

		Protein		Fat		CHO							
enus	Energy (kcal)	(g)	%	(g)	%	(g)	%	Cholesterol (mg)	Diet. Fiber (g)	Calcium (mg)	Iron (mg)	Sodium (mg)	Vitamin C (mg)
a	657	27	17	29	21	85	54	35	1	300	2	2650	2
a	670	55	33	42	30	41	25	180	2	180	5	1660	
a	600	40	26	26	18	71	47	85	7	72	3	470	
a	770	80	42	17	14	78	41	195	5	180	7	950	3
a	690	26	15	17	14	125	69	10	14	120	5	220	
a	620	26	17	28	19	82	55	45	1	300	3	2400	4
a	580	19	13	15	10	107	73	25	8	72	2	470	6
a	600	32	15	22	9	92	64	400	2	96	9	270	3
a	710	28	16	12	9	125	72	280	3	120	8	320	2
Da	600	16	11	6	4	127	84	25	9	48	2	210	7
La	630	19	12	22	15	104	66	55	5	24	5	930	1
2a	750	23	12	15	13	138	73	30	15	120	4	1650	2
3a	617	21	13	63	32	45	24	135	8	96	2	4650	3
4a	620	28	18	23	16	92	59	85	4	180	5	980	1
5a	640	30	19	55	39	42	26	180	6	72	2	1160	4
6a	670	22	13	42	31	73	44	75	3	96	4	640	
7a	690	25	14	52	41	55	31	115	6	72	2	1610	2
8a	630	16	10	51	35	61	39	105	4	180	4	1020	
9a	680	72	19	32	22	45	49	100	4	180	5	3250	2
Da	710	34	43	29	25	86	27	325	5	180	6	860	4
ean	657	32	19	30	21	84	51	124	6	134	4	1319	2
tdDev)	52.23	17.1	9.42	16	10	30	18	104.68	3.71	73.35	2.05	1123.42	20.1

Fourteen lunch menus derived the majority of their energy from carbohydrates, two lunch menus derived the majority of their energy from protein, and four lunch menus derived the majority of their energy from fat, (i.e. SFA, PUFA, MUFA). (Table 5).

The average energy per serving of each dinner meal was 716 kilocalories, ±110.49 SD (Table 3). The dinner menus had an average protein content of 33 grams, 19% of the total energy content of the meals, a carbohydrate content of 91 grams, 50% of the total energy content of the meals, and a fat content of 25 grams, 32% of

the total energy content of the meals. The average cholesterol content of the dinner menus was 96 mg, ±51.76 SD. An average of eleven percent of the energy contained in the dinner menus was from SFA, 7% from PUFA, and 11% from MUFA. Eleven dinner menus had a SFA content within the recommended range of 7 to 10%, fifteen had PUFA content within the recommended range of 0-10%, and twelve dinner menus had MUFA content within the recommended range of 10 to15 percent. Sixteen dinner menus had a protein content of less than 20%, fifteen had carbohydrate content greater than or equal to 45%, and nine dinner menus had a fat content of less than or equal to 30% (Table 4).

DINNER MENUS

Table 3 Nutrient content of dinner menus

		Protein		Fat		CHO							
Menus	Energy (kcal.)	(g)	%	(g)	%	(g)	%	Cholesterol (mg)	Diet. Fiber (g)	Calcium (mg)	Iron (mg)	Sodium (mg)	Vitamin C (mg)
1b	725	28	16	18	23	109	62	70	3	120	8	550	6
2b	888	30	14	29	30	122	56	110	2	72	6	310	1
3b	657	31	19	13	17	107	64	40	9	24	3	230	10
4b	909	29	13	29	28	136	59	50	11	300	5	1740	9
5b	655	46	28	17	24	79	48	95	7	48	3	250	9
6b	748	38	19	13	15	125	65	50	15	360	9	2040	332
7b	830	44	21	26	28	108	51	115	9	180	2	1510	79
8b	621	15	10	28	39	83	51	30	5	72	2	1180	15
9b	802	34	17	9	11	141	72	105	4	180	8	1390	19
10b	880	31	13	31	30	129	56	35	14	240	5	930	15
11b	748	22	12	35	41	91	48	45	7	120	3	1750	19
12b	704	90	52	28	36	20	12	240	5	180	5	3340	74
13b	720	22	12	32	39	90	49	90	6	600	2	2060	44
14b	708	23	13	35	44	76	43	85	3	96	4	920	6
15b	643	29	18	26	37	71	44	115	7	180	5	3500	63
16b	653	37	23	24	33	72	45	140	7	120	5	630	6
17b	604	28	19	14	21	90	60	120	6	120	6	2460	56
18b	726	23	12	38	47	75	41	150	10	420	21	1760	11
19b	680	44	26	25	33	69	41	175	10	180	7	1260	17
20b	419	13	13	25	54	35	33	60	1	48	2	880	19
Means	716	33	19	25	32	91	50	96	7	183	6	1435	41
SD	110.49	15.76	9.07	8.01	10.8	30.87	12.88	51.76	3.65	139.32	4.12	907.83	70.8

Fifteen dinner menus derived a majority of their energy from carbohydrates, two menus derived the majority of their energy from protein, and three dinner menus derived the majority of their energy from fat (Table 4). The average content of dietary fiber in the dinner menus was 7 gm, calcium 183 mg, iron 6 mg, sodium 1435 mg, and vitamin C content of 41 mg (Table 3).

Nine lunch menus had a carbohydrate content greater than or equal to 55%, sixteen had protein content of less than or equal to 20%, and fourteen lunch menus had fat content of less or equal to 30% (Table 5). Eight dinner menus had carbohydrate content greater than or equal to 55% of the total calories, fifteen had protein content of less than or equal to 20%, and 10 dinner menus had fat content of less than or equal to 30% (Table 5).

Six lunch menus had fat content above 30%, and 10 dinner menus had fat content above 30%.

NUTRITIONAL BEHAVIOR OF SNO EMPLOYEES

Forty six percent of the respondents ate 3-5 times a week in the EDR of the SNO. The same number (46%) regularly used the salad bar in the EDR. Sixty-eight percent of the respondents indicated that they were trying to maintain their current weight, 16% were trying to lose weight while 16% were trying to gain weight. Forty-one percent of the respondents indicated that they took vitamin, mineral, or protein supplements.

Eighty-eight percent of the respondents chose food based on taste more than nutrition. Ninety one percent were trying to improve the way they eat. Eighty-three percent exercised routinely at least two times a week to keep fit.

Table 4. Types of fat and their energy content in the lunch and dinner menus (%)*. Menus numbered 'a' are lunch menus; menus numbered 'b' are dinner menus.

Menus	SFA[a]		PUFA[b]		MUFA[c]		Total fat content	
	kcal	(%)	kcal	(%)	kcal	(%)	(gm)	(%)
1a	39	6[a]	7	1[b]	33	5	21	29
1b	87	12	7	1[b]	58	8	18	23
2a	134	20	13	2[b]	80	12[c]	30	42
2b	133	15	27	3[b]	89	10[c]	29	30
3a	54	9[a]	24	4[b]	66	11[c]	18	26
3b	59	6[a]	20	3[b]	46	7	13	17
4a	46	6[a]	8	1[b]	46	6	14	17
4b	45	5[a]	136	15	73	8	29	28
5a	35	5[a]	28	4[b]	41	6	14	17
5b	52	8[a]	20	3[b]	66	10[c]	17	24
6a	25	4[a]	6	1[b]	37	6	19	28
6b	30	4[a]	37	5[b]	37	5	13	15
7a	23	4[a]	23	4[b]	29	5	10	15
7b	42	5[a]	116	14	58	7	26	28
8a	30	5[a]	18	3[b]	24	4	9	22
8b	56	9[a]	31	5[b]	124	20	28	39
9a	21	3[a]	21	3[b]	28	4	9	12
9b	32	4[a]	24	3[b]	24	3	9	11
10a	12	2[a]	6	1[b]	12	2	4	6
10b	88	10[a]	53	6[b]	106	12[c]	31	30
11a	76	12	13	2[b]	44	7	15	22
11b	90	12	30	4[b]	157	21	35	41
12a	60	8[a]	8	1[b]	38	5	13	15
12b	63	9[a]	63	9[b]	99	14[c]	28	36
13a	216	35	37	6[b]	117	19	32	63
13b	144	23	14	2[b]	79	11[c]	32	39
14a	62	10[a]	19	3[b]	43	7	16	23
14b	120	17	57	8[b]	106	15[c]	35	44
15a	102	16	90	14	70	11[c]	39	55
15b	109	17	32	5[b]	84	13[c]	26	37
16a	114	17	54	8[b]	101	15[c]	31	42
16b	65	10[a]	65	10[b]	65	10[c]	24	33
17a	145	21	28	4[b]	152	22	41	52
17b	60	10[a]	12	2[b]	42	7	14	21
18a	151	24	50	8[b]	101	16	35	51
18b	174	24	58	8[b]	44	6	38	47
19a	116	17	14	2[b]	75	11[c]	22	32
19b	68	10[a]	75	11	61	9	25	33
20a	50	7[a]	71	10[b]	71	10[c]	25	29
20b	50	12	63	15	75	18	25	54

a indicates saturated fat content of 7-10%; **b** indicates polyunsaturated fat content of 0-10%; **c** indicates monounsaturated fat content of 10-15% *fat calories as % of total calories

Table 5. Energy and percentage of total calories from selected macronutrients in menus

Menu	Carbohydrate		Protein		Fat	
	kcal	(%)	kcal	(%)	kcal	(%)
1a	355	54	112	17[b]	191	29[c]
1b	450	62[a]	116	16[b]	167	23[c]
2a	168	25	133	22	281	42
2b	497	56[a]	124	14[b]	266	30[c]
3a	282	47	156	26	156	26[c]
3b	420	64[a]	125	19[b]	112	17[c]
4a	316	41	323	42	131	17[c]
4b	536	59[a]	118	13[b]	255	28[c]
5a	476	69[a]	104	15[b]	117	17[c]
5b	314	48	183	28	157	24[c]
6a	341	55[a]	105	17[b]	174	28[c]
6b	486	65[a]	142	19[b]	112	15[c]
7a	423	73[a]	75	13[b]	87	15[c]
7b	423	51	174	21	232	28[c]
8a	384	64[a]	90	15[b]	132	22[c]
8b	317	51	62	10[b]	242	39
9a	511	72[a]	114	16[b]	85	12[c]
9b	577	72[a]	136	17[b]	88	11[c]
10a	504	84[a]	66	11[b]	36	6[c]
10b	493	56[a]	114	13[b]	264	30[c]
11a	416	66[a]	76	12[b]	139	22[c]
11b	359	48	90	12[b]	307	41
12a	548	73[a]	90	12[b]	113	15[c]
12b	84	12	366	52	253	36
13a	148	24	80	13[b]	389	63
13b	353	49	86	12[b]	281	39
14a	366	59[a]	112	18[b]	143	23
14b	304	43	92	13[b]	312	44
15a	166	26	122	19[b]	352	55
15b	283	44	116	18[b]	238	37
16a	295	44	87	13[b]	281	42
16b	294	45	150	23	215	33
17a	214	31	97	14[b]	359	52
17b	362	60[a]	115	19[b]	127	21[c]
18a	246	39	63	10[b]	321	51
18b	298	41	87	12[b]	341	47
19a	333	49	129	19[b]	218	32
19b	279	41	177	26	224	33
20a	192	27	305	43	206	29[c]
20b	138	33	54	13[b]	387	54

a indicates CHO content ≥ 55%; **b** indicates protein content ≤ 20% **; c** indicates fat content ≤ 30

Eighty-three percent read the nutritional information on a food label before purchasing a food product. A majority of the respondents received their nutritional information either from the radio, television, newspapers, magazines and books, or a combination of these sources.

The majority of the respondents stated that daily they consumed 2 servings of milk or other dairy products, 2 servings of either meat, fish, or poultry, 2 servings of fruit and vegetables, and 2 servings of grains or wheat in the EDR of the SNO hotel. The questionnaires also indicated that 84% of the participants completed their own grocery shopping, 13% had others shop for them, and 2% had their mothers shop for them. Table 6 summarizes the responses of participants to questions on nutritional behavior.

NUTRITION ATTITUDES OF SNO EMPLOYEES

Responses to questions on nutritional attitudes indicated that 91% of the respondents agreed that there was too much confusing information today about how to eat a balanced diet. Eighty-one percent viewed the employee meals as being adequate and well-balanced. Ninety-six percent stated that the way you eat can affect the amount of emotional stress you feel. Ninety-five percent indicated that they believe the way you eat can affect your future health and 87% agreed that it is important to set aside time to plan and prepare their meals.

Eighty-four percent agreed that they do not have enough time to practice good nutritional habits, while 82% stated that their financial situation makes it difficult for them to practice good nutrition habits.

Table 6. Nutritional behavior of Sheraton New Orleans Hotel employees

Nutritional Behavior	No.	(%)
How often do you eat in the EDR?	53	46
How often do you use the salad bar in the EDR?	53	46
Are you currently trying to lose weight?	17	16
Are you currently trying to maintain your current weight?	75	68
Are you currently trying to gain weight?	18	16
Do you currently take any vitamin, mineral, or protein supplements?	24	41
Do you choose foods based on taste more than nutrition?	96	88
Do you exercise routinely, at least a couple of times a week, to keep fit?	91	83
Are you are trying to improve the way you eat?	98	91
Which of the following meals do you eat each day?		
Breakfast:	65	57
Lunch:	82	71
Dinner:	88	77
Mid-morning snack:	21	18
Afternoon snack:	25	22
Evening snack:	37	32
Do you often read the nutritional information on a food label before purchasing a food product?		
Yes:	86	83
No:	9	8

Fifty-one percent viewed the meals in the EDR as lacking in some areas, 79% rated the nutritional quality of the meals served in the EDR as either good, very good,

or excellent. Sixty percent were somewhat confident of the nutritional information they were receiving from the radio, television, books, and magazines. Table 7 summarizes the nutritional attitudes of the respondents.

NUTRITION KNOWLEDGE OF SNO EMPLOYEES

Questions designed to determine the nutritional knowledge of the respondents indicated that 60% of the participants thought the best way to achieve a well-balanced diet was to eat a variety of foods. Forty-two percent agreed that fruits and vegetables were the best sources of vitamin A and C. Of the respondents, 46% were aware that to increase dietary fiber intake one should eat more fruits and vegetables. Sixty-one percent agreed that milk, cheese, yogurt, and ice cream were good sources of calcium. Fifty percent stated that to decrease sodium intake you should prepare recipes with spices instead of table salt.

Twenty-four percent agreed that fat is a concentrated source of energy. Sixty-one percent indicated their belief that a balanced diet is a major factor in maintaining good health and 94% indicated that all meals should contain less than 30% kilocalories from fat. Eighty-four percent of the respondents believed it is true that higher fat foods can be part of a healthy diet if balanced with low fat choices. Forty-six percent of the respondents knew that to increase dietary fiber intake, one must eat more fruits and vegetable, while 34% indicated that eating white bread instead of whole-wheat bread, and eating brown eggs instead of white eggs, as well as eating more fruits and vegetables all increase dietary fiber intake. Finally, 88% of the participants in this survey indicated that balance, variety, and moderation are keys to

healthy eating. The results of the nutrition knowledge of SNO employees are summarized in table 8.

Table 7. Nutritional Attitudes of Sheraton New Orleans Hotel Employees

Nutritional attitudes	Number	Percentage(%)
There is too much confusing information today about how to eat a balanced diet.	93	91
You view the employee meals as being adequate and well-balanced.	87	81
The way you eat can affect the amount of emotional stress you feel.	106	96
You are concerned that the way you eat can affect your future health.	105	95
It is important to set aside time to plan and prepare your meals.	94	87
Are you confident in your ability to select a healthful diet?	70	62
You do not have enough time to practice good nutritional habits.	97	84
Your financial situation makes it difficult for you to eat nutritionally.	87	82
Physical activity is an important part of maintaining your health.	107	96
I view the meals in the EDR as lacking in some areas.	54	51
How would you rate the nutritional quality of the meals served in the EDR?		
Excellent:	19	18
Very good:	22	21
Good:	42	40

Table 8 Nutritional Knowledge of Sheraton New Orleans Hotel Employees.

Nutritional knowledge survey items	Number	Percentage (%)
The best way to achieve a well-balanced diet is to:		
Take a vitamin a day	2	2
Eat only certain foods	8	8
Eat a lot of raw fruits and vegetables	29	30
Eat a variety of foods	58	60
Which of the following food groups are the best sources of vitamin A and C:		
Meat, fish, and poultry.	2	2
Milk and cheese.	10	9
Fruits and vegetables.	46	42
Bread and cereals.	51	49
Higher fat foods can be part of a healthy diet if balanced with low fat choices:		
True:	91	84
False:	18	17
Balance, variety, and moderation are the key to healthy eating:		
True:	95	88
False	13	12
A balanced diet is a major factor in maintaining good health:		
Strongly agree.	33	30
Agree.	34	31
No opinion.	13	12
Disagree.	8	7
Strongly disagree.	22	20

Table 8 cont'd

Nutritional knowledge survey items	Number	Percentage (%)
To increase dietary intake of fiber, one should:		
Eat brown eggs instead of white eggs.	5	5
Eat white bread instead of whole-wheat bread.	17	16
Eat more fruits and vegetables.	50	46
All of the above.	37	34
Other than milk, which of these foods are good sources of calcium?		
Oranges and bananas.	8	7
Potatoes and pasta.	15	14
Chicken and fish.	20	18
Cheese, yogurt, and ice cream.	66	61
To decrease your sodium intake, you should:		
Use seasoned salt instead of table salt.	14	13
Use condiments like soy sauce, mustard, and relish instead of table salt.	23	21
Eat canned and commercially- prepared foods more often.	17	16
Prepare recipes with spices such as oregano, basil, and thyme.	54	50
Fat is important in the body because:		
It is the most concentrated source of energy.	25	24
It is a type of protein.	22	21
It is found in all foods.	13	12
All of the above.	45	43
All meals should contain less than 30% calories from fat:		
True:	102	94
False:	7	6

RESPONSES TO QUESTIONS ASKED TO THE CHEF OF THE SNO DURING INTERVIEW

1. How would you classify a healthful diet?

Ans: "A healthful diet is a diet that is balanced and contains the main food groups, that is your starch, protein, fat, vegetables, and dairy products ".

2. How would you classify the nutrition knowledge of your chefs and cooks?

Ans: " Nutrition knowledge is very much a major objective during my recruitment screening, and hiring process, and I make it a point to provide any new pertinent information from various culinary and nutritional bulletins to my staff. I also actively seek new information from the Internet, which I pass on to my staff. I actively encourage my chefs to read the various nutritional labels on our food products, and to be able to meet a customer's request for a special diet, for example a fat-free diet or salt-free diet. I would therefore say my staff is quite aware of the basic nutritional trends, and the major areas of concern to consumers ".

3. How does your nutritional knowledge influence your planning of menus for your customers?

Ans: " Menu planning is a complex area in the hospitality industry, since the corporate culture is first and foremost profit driven. To plan a menu, you have to take several factors into account, including food cost, the consumers' desires, manpower and productivity, aesthetics, and palatability of the menu. A major factor influencing all these factors is demography and cultural practices. For instance, in a location like New Orleans, consumers are more interested in Creole recipes, seafood, and various spicy dishes, whereas in other places the demand might be for low fat, less dense menus. Hence

to plan a nutritious menu in any location there should be a give and take, so that you do not compromise your food cost and productivity and also ensure that consumers will patronize your creation ".

4. What factors influence planning menus for your employees?

Ans: "All the factors I cited above apply. Also, consideration must be given to the demographic makeup of the staff. Reviews I get from the staff for certain menus are in total contrast to what I hear from customers dining in our restaurant on the same menu. For instance, deep fried foods are more popular with the staff than with paying customers. Therefore in planning menus for the staff, I try as much as possible to let the menus be very similar to the menus in our public restaurant, but also a bit tuned towards the taste and preferences of the staff. For example, I might substitute fried chicken or fried catfish for roasted chicken or grilled catfish in the restaurant for the employee dining room. Cost does not play as big a role in planning employee meals as employee satisfaction does. Finally, when planning meals, I always try to put much thought and balance into the nutritional aspects of the cuisine ".

5. How would you rate the nutrition knowledge of your employees?

Ans: " The nutritional awareness of the entire hotel population varies a lot. This is due to the fact that there are various levels of education, cultural practices and diversity in the population. For example, most of the employees in housekeeping or utilities are more attracted to the taste of meals more than the nutritional quality. They would be more grateful for some real spiced up piece of tasty fried chicken than those performing high-ended administrative work. This tells me that there are some very nutrition conscious

employees as well as employees who wouldn't care much about how nutritionally balanced a meal is ".

6. How would you classify the nutritional quality of the meals served in the employee dining room?

Ans: " The quality of the meals served in the entire hotel I believe is nutritionally balanced. I focus on trying to make the meals conform to the recommendations in the Dietary Guidelines for Americans, as well as the Food Guide Pyramid. I focus on keeping fat in most of the menus below 30% and protein under 25%. I emphasize increasing the fiber content in all the meals, and ensure that there are always a variety of fresh and quality food products to choose from ".

7. What is your attitude towards general nutrition?

Ans: "As a chef I am responsible for the nutritional content of the food I prepare, I am always concerned about the fat and salt content of the food I prepare ".

8. As a chef what are your food preparation practices, do you think it is important to:

a). Provide a vegetarian selection on your menu?

b). Provide more fruit and vegetable selections as part of menu offering?

c). Use lean beef and pork, and trim excess fat off poultry?

d). Moderate the use of processed foods?

e). Increase the use of grains, rice, and legumes in meal preparation?

f). Use only moderate amounts of salt in cooking?

Ans: " I try to apply all the above principles in menu creation and food preparation, but as I said earlier, you need to pay attention to the taste preferences and cultural practices of your customers. If they prefer a much more fatty menu to the low fat types you cannot

impose anything on them. To be able to serve low fat menus your customers must be educated about the health benefits of such meals. Secondly, cost plays a vital role in food preparation practices, especially labor cost when you decide to prepare meals from scratch ".

9. What is your attitude towards the DGA?

Ans: " I strongly believe that both my internal and external customers do not care much, or are not aware of the US Dietary Guidelines; also chefs are not trained to focus solely in terms of the Dietary Guidelines and besides preparing healthy food is costly ".

10. How much of a part did nutrition play in your training as a chef?

Ans: "As you know I attended the Culinary Institute of America. Nutrition training is very important there. We received more nutrition training than most medical students. We had two courses in nutrition, one was a lecture course, and the other was a more hands on approach in a restaurant. Nutrition was integrated into every part of the curriculum ".

CHAPTER 5

DISCUSSION

The results of this study indicated a response rate of 39%. The lack of a higher response rate could be due to the fact that the questionnaire was too long, and respondents found it tedious making time to answer the questions. Secondly, the questions may not have provided enough depth and explanation for the respondents to fully understand them as suggested by Rea et al., 1997; Dillman et al., 1994; and Tourangeau et al., 2000. The proportion of women and men, (i.e. 71% and 29% respectively) of respondents who took part in this survey agrees with the research conclusions of Morreale et al., 1993, which showed that women continue to place a higher level of importance on nutrition than men, and therefore maybe more likely to show interest in nutritional surveys. This finding could also be due to the fact that women show more interest in participating in surveys than men.

The result that fifty-one percent of the respondents were 31 years or older, supports findings that people aged 35 years and older are more concerned about nutrition than younger people (Morreale et al., 1993; Cleveland et al., 1997; National Center for Health Statistics and Centers for Disease Control and Prevention, 1997). The proportions of African Americans respondents to Caucasian-Americans respondents, as well as respondents from other races (i.e. 55%, 40%, and 5% respectively) agrees with the ethnic composition of the SNO's employee population.

The nutritional behavior section of the questionnaire indicated that a low percentage of the respondents (i.e. 46.5%) ate meals from the EDR between three to five times per week. This could be due to the fact that the majority of the employees

do not like the appearance, taste, or menu choices offered in the EDR. Even though this conclusion is confirmed by 51% of the respondents who viewed the meals served in the EDR as lacking in some areas, it is at odds with 79% of the respondents who rated the nutritional quality of the meals served in the EDR as either good, very good, or excellent. This discrepancy in the responses about the meals served in the EDR may be caused by mixed and confusing nutritional messages they have received through the journals, newspapers, or television, or that they were not sure about rating the nutritional quality of the EDR meals.

Utilization of the salad bar in the EDR by 46% of the respondents corresponds with the same percentage who indicated that they ate their meals when at work three to five times in the EDR. This finding could suggest that most of those who ate their meals from the EDR when at work also utilize the salad bar. Sixteen percent of the respondents indicating that they were trying to gain weight confirms results from other studies, (Variyam et al., 1997; Biing et al, 2000; Siao et al., 1998), which indicate that too many Americans (58 million) are overweight, and many of them are trying to lose weight. However, 16% of the respondents who indicated that they were trying to gain weight is an unusually high percentage. This is not in agreement with results from other studies, (Variyam et al., 1997; Biing et al, 2000; Siao et al., 1998), which indicate that many Americans are trying to lose weight. Most people try or are encouraged to gain weight for reasons such as recovery from either an eating disorder like anorexia, chronic illnesses like cystic fibrosis, or recovery from severe illnesses. Therefore, one explanation why 16% indicated that they were trying to gain weight could be cultural preferences that create a certain acceptable image about weight gain,

especially among women. A study by Pumariega et al., 1994, suggested that the African-American culture is much more accepting of diverse body sizes and seems to favor broader beauty ideals. Hence with the majority (55%) of the survey respondents being African-American, it is possible that most of those who indicated that they wanted to gain weight may be among the African Americans who participated in this study.

Even though 41% of the respondents who indicated that they took vitamin, mineral, and protein supplements, is consistent with the ADA's Trends 2000 public opinion survey and the International Food Information Council (IFIC) study where 49% and 48% respectively of adults indicated that they took vitamin supplements. It could also indicate that they were aware that their diets were lacking in certain areas (Enns et al., 1997). The high proportion of respondents (91%) who indicated that they were trying to improve the way they eat, is consistent with other survey results which indicate that most Americans were trying to improve the way they eat. (ADA, 2000; IFIC, 1998). But then it contradicts the finding that 84% agreed that they did not have enough time to practice good nutrition habits, which the need for nutrition education on how to prepare healthy and nutritious meals inexpensively.

Sixty-two percent of the respondents indicating that they were confident about the nutrition information they were receiving contradicts the response to the question whether there was too much confusing information about nutrition today. The majority, 91%, agreed that there is too much confusing information about how to eat a balanced diet. These findings suggest the need for much more efficient ways of providing nutritional information to the general public

Eighty-three percent of the respondents indicating that they exercised a couple of times a week to keep fit, confirms the findings of the ADA public opinion survey "Nutrition and you: Trends 2000". This result also suggests that the respondents were following the recommendations on physical activity made in the DGA of the USDA, but it does not indicate whether the respondents were aware of the DGA or understand the recommendations made in the DGA. A high proportion of the respondents (83%) indicated that they read the nutritional information on food labels before purchasing it. This is consistent with the study by Morreale et al., 1993, where more than 85% of the respondents stated that they read the nutritional label on food products before purchasing them. This result also confirms the desire of the respondents to improve the way they eat in order to improve their health. Even though this behavior may be a positive thing, reading the food labels does not guarantee that the respondents understand what and know how to interpret what they are reading, and how to apply that to improve their diet. This result was confirmed by research studies (Derby et al., 1995; Miller et al., 1997) that found that consumers had fairly good knowledge of nutrient content claims, but their knowledge of health claims were clearly lacking.

The majority of the respondents indicated that they ate two servings per day of bread and cereals. This is very low compared to the recommendations of the FGP. The respondents either did not know what a serving is, or that they knowingly did not follow the recommendations in the FGP and the DGA. This finding contradicts the response on their ability to select a healthful diet where 62% indicated that they were very confident about selecting and eating a healthful diet. Majority of the respondents

indicating that they ate 2-3 servings of dairy products a day, is very unusual. This could be due to the fact that either the respondents did not know how to measure a serving or they were intolerant or allergic to dairy products.

Questions about nutrition attitudes show that most of the respondents (95%) were concerned that the way you eat can affect your future health. This finding is consistent with results from studies on nutrition attitudes by other researchers (Rostler, 1999; IFIC, 1998). The fact that the majority of the respondents in this study (82%) indicated that their financial situation makes it difficult for them to eat right nutritionally may suggest that the respondents were not getting the right nutrition information on how to prepare or eat meals that were nutritionally balanced and healthful without it being costly. This attitude could also imply that even though they may be getting adequate information on how to eat healthfully, they are not motivated to expend the effort to follow the nutritional advice they are receiving. This thought is confirmed in a research study by the ADA, where the results indicated that 41% of respondents felt they were doing all they could to achieve a balanced diet (ADA public opinion survey, Trends 2000). Ninety-six percent agreed that the way you eat can affect the amount of emotional stress you feel, which was consistent with results from other studies (Morreale, et al., 1993; IFIC/ADA, 1998; ADA, Trends 2000).

The responses of the respondents to the questions on nutrition knowledge indicate that the majority (88%) were aware of the basic nutrition advice that balance, variety, and moderation are key to healthy eating, and that eating a variety of foods was the best way to achieve a well-balanced diet. These results are consistent with the results of the IFIC/ADA survey where over two-thirds of respondents believed that

balance, variety and moderation are keys to healthy eating. This result also follows the recommendations of the DGA. The respondents confirmed that fruits and vegetables were the best sources of vitamin A and C, as well as good sources for increasing dietary fiber intake. They also confirmed that milk, cheese, yogurt, and ice cream were good sources of calcium. This indicates that they were aware of the basic nutrition information as recommended in the DGA and the FGP. They also indicated that the best way to reduce sodium intake was to prepare recipes with spices. These findings may suggest that the recommendations of the DGA were getting through to consumers.

An IFIC/ADA study, stated that most American were aware of the health concerns about fat, but could not correctly interpret nutritional advice. This finding is confirmed by the respondents because the majority (94%) knew that the total daily fat consumption from all meals should be less than 30% of calories from dietary fat, and 84% agreed that higher fat foods can be part of a healthy diet if balanced with low fat choices. However, only 24% agreed that fat is a concentrated source of energy. This result could stem from the fact that most of their nutrition knowledge about fat emphasizes the negative effects of fat, and does not stress its beneficial effects.

Nutritional analysis of both the lunch and dinner menus indicates that they contain adequate energy (662 kcal and 716 kcal respectively). This is based on a total daily energy consumption of 2000 kilocalories, as recommended by nutritionists that energy from lunch and dinner meals should be 30% respectively of the total daily energy requirement (Maher et al., 1996; Classick-Kohn, 2001). The average protein content of both the lunch and dinner menus (19%) of the daily total energy consumed

is within the recommended range of energy from protein, which is between 12 to 20 percent (Macdonald, 1999; Classick-Kohn, 2001). The average proportion of daily total energy from carbohydrates of both the lunch and dinner menus is within the range of 50 to 60 percent as recommended by the Food and Nutrition Board of the National Research Council (Classick-Kohn, 2001; Macdonald, 1999; Clark, 1998). The average total fat content of both the lunch and dinner menus is within the recommendations of the Food and Nutrition Board of the National Research council, that recommends that energy from fat should be between 25-39% of the total energy content of a meal (Classick-Kohn, 2001; Clark, 1998; Ghannem et al., 1999; Kris-Etherton et al., 1999). Even though the fat content is within the recommended range of energy from fat, taking into account fat consumption from all other sources, it could exceed the recommended amount of total energy from fat. This result is further confirmed by the fact that the average SFA of both the lunch and dinner menus (12% and 11% respectively), is higher than the recommended range (Grundy, 1997). The average cholesterol content of both the lunch and dinner menus (124 mg and 96 mg) is within the recommended range of less than 300 mg/day, but in combination with cholesterol from other food sources may exceed the recommended level. (Classick-Kohn, 2001; Clark, 1998; Ghannem et al., 1999; Kris-Etherton et al., 1999). As the analysis in tables 2 and 3 indicate that majority of the menus were balanced for the macronutrients, and contained adequate energy as recommended for a lunch or dinner menu, and could maintain the body, as well as daily activities without much excess, if appropriately balanced with energy from other food sources. (Macdonald, 1999; Classick-Kohn, 2001).

The amount of other leader nutrients were mixed as far as their of adequacy in the SNO menus. The average dietary fiber content of both the lunch and dinner menus (7 gm) is inadequate and is far lower than the 25 gm per day recommended by the Food and Nutrition Board of the National Research Institute (Grimm, 1999; Macdonald, 1999; ADA position paper, 1997). This proportion of dietary fiber may have increased if utilization of the salad and fruit bars, as well as fiber intake from other food sources were included in the analysis. The total calcium content of both the lunch and dinner menus (243 mg), is inadequate and far lower than the recommended 1200 milligrams per day (Kramer-LeBlanc, 1999; Mardis et al., 2000). In order to achieve the recommended daily calcium requirement, employees would have to increase their intake of calcium rich foods. The average total sodium content of both the lunch and dinner menus (2031 mg), is higher than the recommended daily average of 2400 milligrams (Mardis et al., 2000; Kramer-LeBlanc et al., 1999). This finding implies that the sodium content of the meals served in the EDR is too high and exceeds the recommended level. The total average vitamin C content of both the lunch and dinner menus (68 mg), falls within the daily intake of vitamin C recommended by the 1989 RDA (Mardis et al., 2000; Kramer-LeBlanc et al., 1999). This proportion may also have increased if analysis of the fruit and salad bar utilization had been considered. The average total iron content of both the lunch and dinner menus (10 mg), is adequate and in combination with iron from all other food sources comsumed could meet the recommended daily requirement of 15 milligrams (Mardis et al., 2000; Kramer-LeBlanc et al., 1999).

Qualitative analysis of the responses of the executive chef of the SNO to the questions submitted to him indicate that he had an idea of the basic components of a healthful diet, and makes an effort to try and achieve a healthful diet with his culinary creations. But from analysis of his lunch and dinner recipes, it is quite clear that even though he may aspire to create a healthful diet, he may lack the necessary knowledge to reduce saturated fat and sodium content in his menus. Results of the menu analysis and the interview with the chef, suggest that although he is practicing some healthful food preparation techniques, the use of practices necessary to produce foods that more closely follow the recommendations of the DGA could be increased, especially given the chef's positive attitude toward healthful food preparation practices. Even though he may be aware of the DGA and the FGP, he does not seem convinced that their recommendations can be achieved taking into account the cultural practices and preferences of his SNO community. He also indicated that cost was a major concern in creating healthful menus, just as indicated by the respondents in this study. This indicates that, he may not have the necessary knowledge to create inexpensive, healthful, and nutritious menus or that it is not necessarily an easy task. Unfortunately, many foods that employees like are high in fat, sodium, sugar, and cholesterol and low in fiber, vitamins, and minerals.

A major focus of the DGA and the Healthy People 2010 objectives is limiting energy from fat as a strategy to reduce the risks of obesity, heart disease, and other life-threatening and limiting conditions. Although the executive chef of the SNO does not think most of the employees care about nutrition, due to the cultural food preferences in New Orleans, this is in direct contrast with the responses of the

respondents in this study to importance of nutrition. The chef agrees that chefs are responsible for the nutrient content, especially fat, in the foods they prepare, and that it is important to provide nutrition information to customers. Yet the factors of taste, time, and training pose barriers to preparing food according to the DGA. Consequently, one of an executive chef's greatest challenges today is finding foods that satisfy both guidelines for nutrition and please the palate of employees.

The chef's attitude with regard to the DGA indicates that much more emphasis must be placed on how to achieve the recommendations in the DGA and FGP in the culinary training of chefs, so that when they start practicing their trade, they may be equipped with the necessary knowledge to meet these recommendations.

The limitations of this study must be considered when reviewing the conclusions drawn from this investigation. The study was restricted to full time employees of the SNO. Care must be taken when extrapolating the conclusions of this study to other hotels of comparable size, since demographic, cultural practices, and the nutritional knowledge of chefs and employees in these establishments may differ from those at the SNO. The participants' utilization of the EDR while at work was also not uniform. The low response rate to the survey also limits the ability to generalize the findings. Lack of analysis of utilization of the fruit and salad bars in the EDR weakens the conclusions drawn from the nutritional analysis. A much more complete conclusion may have been reached if the study design had included breakfast menus, as well as beverage consumption. Despite these limitations, the results provided valuable information that may be of interest to the chef of the SNO as well as other chefs in designing meals for employees in the hotel industry. The

conclusions indicate that the chef and employees of the SNO are aware of the basic concepts of good nutrition, as indicated in the DGA, and with a little help may be able to select and prepare healthful meals and practice good nutrition.

Menu planners need to apply basic food science and nutrient content principles to prepare meals that are consistent with the DGA, especially recipe modification techniques that are healthful but do not alter the taste of the food in order to help consumers achieve healthful diets. Learning these techniques and principles in a laboratory setting, rather than in the classroom, is probably more effective as emphasized by Hamm et al, who found that hotel and restaurant management students had a fairly poor knowledge of nutrition, especially regarding food composition (Hamm et al., 1995). This is especially significant since some of these students are chefs who may manage restaurants and other food service establishments in the future.

One method to maximize the positive attitudes of chefs toward revising their food preparation practices is to highlight taste as an essential determinant of food choice, thereby reducing the ambivalence between the public belief in healthful food and food choice behavior. Chefs can be empowered to use their culinary expertise in developing good taste, and low fat menu items.

APPLICATION

The constant flow of nutrition and food science information through the media and other outlets presents an opportunity for dietitians to become educators in the food science and culinary industry. This requires the need for chef-dietitian cooperation working together to deliver more healthful menu choices to the public. In

particular, dietitians can help chefs learn about food science and recipe modification principles as they apply to healthful cooking practices that are not time consuming. However, for the chef-dietitian team to be effective, the dietitian needs to translate "dietitian –speak" to "chef-ese".

A chef's frame of reference is taste and appearance, yet dietitians frame food advice in nutrient-based messages, undervaluing flavor and the pleasure of eating (Hamm et al., 1995). To respond to public demand for healthful menu choices and help chefs follow the recommendations of the DGA and the FGP, dietitians need to learn what chefs know and do not know. The results of this study provided information on nutriton knowledge and food preparation practices in a commercial hotel operation on which dietitians can focus when they work with chefs.

Greater emphasis must be placed on nutrition education during the culinary training of chefs. Chefs need to be taught healthful food preparation practices to produce healthful foods that their employees and paying customers will prefer. Dietitians need to promote their ability and availability to cooperate with chefs by interpreting information in practical ways as chefs currently rely mainly on books, newspapers, and the Internet for nutrition information.

Cooperation between chefs and dietitians in practical settings, where the payoff is consumer satisfaction, will be a major step toward achieving healthful eating practices as recommended in the DGA. The results of this study suggest the need to provide application oriented training that can be self-administered by chefs to help them apply what they already know about the DGA to the planning and preparation of menus. However, due to the small number of participants in this study,

further research is needed to determine if the results of this study are representative of the quality of meals served in all employees' dining facilities in all hotels.

A challenge for dietitians is to identify and overcome barriers to the successful implementation of the DGA within the hotel industry so that meals that promote good health are available to customers and employees alike. A major concern for nutritionists would be that the attitude of the chef at the SNO is that employees of SNO do not care about the DGA. Secondly, chefs and dietitians need to cooperate to provide a consistent nutrition message about why and how to apply current dietary recommendations within the context of the daily lives of employees. A key element in promoting dietary improvement is to demonstrate to consumers that healthful eating can be enjoyable and easier to sustain than they think. This can be achieved by providing the general public with positive, practical, and actionable ideas for overcoming obstacles to improved eating.

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APPENDIX A

HUMAN SUBJECTS APPROVAL FORM

required

5. Does the project include ANY research activity with human subjects not exempted under one or more of the above criteria?

YES___ Check C2: IRB review required

NO_X_ Check C1; Go to Part C and proceed accordingly

Part C: PRELIMINARY EVALUATION of EXEMPT STATUS by Investigator:

C1 ____ C2 ____ If C1, or C1 AND C2 are checked, seek an exemption. If only C2 is checked, IRB review is required (Directions on p. 1.)

Exemption Applicant: Send 2 copies of completed form, a brief project protocol (adequate to evaluate risks to subjects and your responses to Parts A & B), instruments, and the consent form to ONE member in the most closely related department/discipline or to IRB office.

HUMAN SUBJECTS SCREENING COMMITTEE MEMBERS:

COLLEGE OF ARTS AND SCIENCES:

Dr. Baumeister*	(Psych)	388-4663
Dr. Williamson*	(Psych)	388-1494
Dr. Geiselman *	(Psych)	763-2695
Dr. Deseran	(Socio)	388-1113
Dr. Honeycutt	(Speech)	388-6676
Dr. Dixit	(Comm Sc./Dis)	388-3938

ED/LIBRARIES/INFO SCI

Dr. Kleiner	(Middleton)	388-4016
Dr. Taylor	(Admin&Fnd)	388-2193
Dr. Landin*	(Kinesiol)	388-2036
Dr. Munro*	(Curric & I)	388-2352
Dr. Saia	(Lab Sch)	388-3221
Dr. Wandersee	(Curric)	388-2348
Dr. Paskoff	(Lib/Sci)	388-1480

MASS COMMUN/SOC WK/AG:

Dr. Nelson	(Mass C)	388-6686
Dr. Archambeault	(Soc Wk)	8-1374
Dr. Kim	(Soc Wk)	388-1109
Dr. Rose	(Soc Wk)	388-1015
Dr. Biswas	(Marketing)	388-8818
Dr. Bedeian	(Mgmt)	388-6141
Dr. Keenan*	(Hum Ecol)	388-1708
Dr. Belleau	(Hum Ecol)	388-1535
Dr. Leighninger	(Soc Wk)	8-5887

IRB Office: 117 David Boyd Hall
(* = IRB memberr)

irbexem.txt (06/25/98)

APPENDIX B

INSTRUCTIONS COVER PAGE FOR PARTICIPANTS

The attached questionnaire is part of a research study looking at the quality of Sheraton New Orleans hotel's (SNO) employee meals and the employees' perception of the quality of their meals. The study will analyze the proportions of the major nutrients in lunch and dinner menus served in the employees' dining room, using recipes provided by the Executive Chef of the SNO. The questionnaires will be analyzed to determine SNO employees' nutritional attitudes, behavior, knowledge, and their perception of the quality of the meals they are served.

Please read and answer all questions, and please drop your answered questionnaires in the Stewarding department mailbox located on the sixth floor (Executive offices) by July 31st, 1999. Please be as complete and as accurate as you can.

All information is to be kept anonymous, and will be kept confidential.

If you have any questions please do not hesitate to contact Dr. Evelina Cross at the School of Human Ecology, Louisiana State University on tel. no. (225) 388-8424) or Eugene Tetteh Gorleku at the Sheraton New Orleans hotel on tel. no. 595-6286.

APPENDIX C

THE NUTRITIONAL ATTITUDE, BEHAVIOR, KNOWLEDGE QUESTIONNAIRE

QUESTIONNAIRE

With the aid of the following questionnaire, we hope to learn about your eating patterns, nutritional knowledge, and attitudes towards the meals served in the employee dining room (EDR) of the Sheraton New Orleans Hotel (SNO).

Please take a few minutes to carefully complete the questions below by filling in the oval next to the answer with a #2 Pencil, that best fits your response. Most of the questions deal with nutrition knowledge, attitudes, and behaviors. Please return the survey to the stewarding mail box on the sixth floor by 3/31/00.

DO NOT PUT YOUR NAME ANYWHERE ON THIS SURVEY. Your questionnaire will be identified by a code number only so that all of your answers will be kept strictly anonymous and confidential. Only the investigators will see these responses. Your participation in this study is completely voluntary. By completing this questionnaire, you agree to participate in this study.

1. Sex: Male Female

2. Age: 17 years and under
18-21 years
22-26 years
26-30 years
31 years and older

3. Years with SNO: 1-5 months
6-12 months
1-5 years
5-10 years
10 years or more

4. Race: Caucasian
African American
Other:_____

BEHAVORIAL

5. Who does grocery shopping and prepares meals at home:

Myself
Mother
Father
Other_____

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
6. There is too much confusing information today about how to eat a balanced diet.....					
7. You view employee meals as being adequate and well balanced.....					
8. The way you eat can affect the amount of emotional stress you feel.....					
9. You are concerned the way you eat now can affect your future health.....					
10. Foods that are good for you usually don't taste good.....					
11. It is important to you to set aside time to plan and prepare your meals.....					

KNOWLEDGE

12. Any food can fit into a healthy diet.....					
13. You often read the nutritional information on a food label before purchasing a food product.....					
14. When new books, articles, or TV programs are released about dieting and nutrition, you usually try to read or see them.....					

15. The best way to achieve a well-balanced diet is to:
Take a vitamin supplement every day
Eat only certain types of foods
Eat a lot of raw fruits and vegetables
Eat a variety of foods

16. Which of the following food groups are the best sources of Vitamin A and C:
- Meat, fish and poultry
- Milk and cheese
- Fruits and vegetables
- Bread and cereals

17. Starchy vegetables such as potatoes, corn, and peas, as well as dishes made with pasta or rice
- Are very fattening.
- Provide many vitamins and minerals, as well as energy.
- Have more calories than equal amount of fatty foods such as butter, magarine and sour cream.
- Both (b) and (c)

18. Excessive consumption of alcoholic beverages can lead to malnutrition by:
- Decreasing appetite.
- Replacing foods in the diet which are nutritious.
- Causing weight gain.
- Causing cancer.

19. To increase dietary intake of fiber, one should:
- Eat brown eggs instead of white eggs.
- Eat white bread instead of whole-wheat bread.
- Eat more fruits and vegetable.
- All of the above

20. If you want to increase muscle mass, you should:
- Avoid carbohydrates such as bread, pastas and potatoes.
- Eat 12 to 16 ounces of red meat per day to increase your protein intake.
- Perform more weight-bearing exercises.
- Both (b) and (c)

21. Other than milk, which foods are good sources of calcium?
- Oranges and bananas
- Potatoes and pasta
- Chicken and fish
- Cheese, yogurt and ice cream

22. A diet high in sugar:
- Provides only temporary energy.
- Is often high in fat too.
- May lack foods which are nutrient dense.
- All of the above

23. To decrease your sodium intake, you should:
- Use seasoned salt instead of table salt.
- Use condiments like soy sauce, mustard and relish instead of table salt.
- Eat canned and commercially-prepared foods more often.
- Prepare recipes with spices such as oregano, basil and thyme.

24. Fat is important in the body because:
- It is the most concentrated source of energy.
- It is a type of protein.
- It is found in all foods.
- All of the above

25. Besides meat, all of the following are good sources of iron except:
- Whole grain and enriched cereals.
- Milk.
- Dried fruits.
- Dried beans.

26. Which of the following statements is true?
- Some foods contain a lot of fat but no cholesterol.
- Exercise can increase the level of high density lipoproteins, ie. HDL ('good cholesterol') in your body.
- A family history of high cholesterol can be a risk factor.
- Both (b) and (c)

27. Possible benefits of increasing fiber in your diet are:
- Prevention of constipation.
- Possible prevention of colon cancer.
- Possible weight loss.
- (a), (b) and (c)

16. Which of the following food groups are the best sources of Vitamin A and C:
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- Fruits and vegetables
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- Exercise can increase the level of high density lipoproteins, ie. HDL ('good cholesterol') in your body.
- A family history of high cholesterol can be a risk factor.
- Both (b) and (c)

27. Possible benefits of increasing fiber in your diet are:
- Prevention of constipation.
- Possible prevention of colon cancer.
- Possible weight loss.
- (a), (b) and (c)

28. A balanced diet is a major factor in maintaining good health:
- Strongly agree
- Agree
- No opinion
- Disagree
- Strongly disagree

29. A factor related to obesity is:
- Over eating
- Family history
- Thyroid disorders
- (a), (b) and (c)

30. The nutrient groups which provide calories include:
- Fat, vitamins and carbohydrates.
- Minerals, vitamins and fats.
- Vitamins, proteins and fats.
- Proteins, fats and carbohydrates.

ATTITUDE

31. Are you concerned about developing any of the following?
- High cholesterol
- High blood pressure
- Diabetes
- Heart disease

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
32. You don't have enough time to practice good nutritional habits					
33. Physical activity is an important part of maintaining your health					
34. You choose foods based on taste more than nutrition					
35. Your financial situation makes it difficult for you to eat nutritionally					
36. You are trying to improve the way you eat					
37. You exercise routinely, at least a couple of times a week, to keep fit					

38. Which of the following meals do you eat each day? (Check all that apply)
- Breakfast
- Mid-morning snack
- Lunch
- Afternoon snack
- Dinner
- Evening snack
- Other_____

39. On average, how many servings a day do you eat of the following groups in the EDR?

Milk, and other dairy products	Meat, fish, and poultry	Fruits and Vegetables	Bread and cereals
☐	☐	☐	☐

40. How often do you eat in the EDR?
- Once a week
- 2-3 times a week
- 4-5 times a week
- Daily
- Never

APPENDIX D

CONSENT FORM

The Quality of Hotel Employee Meals and Employees' Perception of the Meals

Letter of Consent

I……, agree to voluntarily participate in the above named study. The study and its purpose has been clearly explained to me. I understand that I can at any time during this study withdraw my participation without any consequences. I further understand that all responses to this study are confidential, and no individual will be identified in reporting the results.

Signed……

Date……

APPENDIX E

TWENTY-DAY CYCLE MENUS

LUNCH MENUS

1a)
Roast pork loin
Idaho au gratin potatoes
Mixed vegetables and sweet corn kernels.

2a) Flank steak with pepper and onions
Idaho au gratin potatoes
Sliced carrots

3a) Grilled channel catfish fillet with lemon sauce
Steamed wild rice
Mixed vegetables

4a) Sliced roast beef
Whole baked potato
Steamed sliced carrots

5a) Fried chicken
Macaroni and cheese
Mixed vegetables

6a) Stuffed bell pepper
Garlic mashed potato
Steamed broccoli

7a) Braised short ribs
Red bliss mashed potato
Zucchini and yellow squash

8a) Liver and onions
Mushroom rice
Green bean provencale

9a) Liver and onions
Seasoned French fries
Green beans provencale

10a) Cajun meatloaf
Garlic mashed potato
Mixed vegetables

11a) Roasted chicken breast
Steamed short grain white rice
Steamed whole baby carrots
Yellow corn on the cob

12a) Sweet and sour pork
Steamed long grain white rice
White sweet corn on the cob-cut kernels

13a) Roasted boneless chicken breast
Baked potato
Carrot and sweet corn kernels

14a) Jerk chicken
Steamed long grain rice
Sweet corn kernels

15a) Fried cat fish Creole
Steamed Idaho potato
Green peas

16a) Smothered pork chops
Steamed white rice
Green snap string beans

17a) Grilled fresh fish with lemon sauce
French fries
Steamed whole carrots and green peas

18a) Crawfish with cheese
Puffy pastry
Green beans

19a) Flank beef steak
Steamed long grain rice
Mixed vegetables

20a) Boneless chicken strips in oyster sauce
Egg fried rice
Oriental vegetables

DINNER MENUS

1b) Beef steak flank (choice O lean)
Steamed long grain white rice
Mixed vegetables and sweet corn kernel

2b) Chicken fricasse
Rice pilaf
Sliced carrots

3b) Broiled pork loin
Boston market new potatoes
Mixed vegetables

4b) Roasted Chicken breast
Long grain white rice parboiled
Steamed fresh sliced carrots

5b) Broiled channel catfish
Steamed long grain rice
Mixed vegetables

6b) Roasted boneless chicken breast
Steamed long grain white rice
Steamed broccoli
Mixed vegetables

7b) Blackened catfish
Red bliss mashed potato
Zucchini and yellow squash

8b) Buffalo chicken wings (spicy)
French fries
Green beans Provencale

9b) Grilled Atlantic salmon with lemon sauce
Shrimp fried rice
Green beans Provencale

10b) Fried chicken
Macaroni and cheese
Mixed vegetables

11b) Pork sausage patties on French bread
French fries
Yellow corn on the cob

12b) Boneless chicken strips in oyster sauce
Steamed long grain white rice
Oriental vegetables
White sweet corn on the cob-cut kernels

13b) Macaroni and cheese
Mashed baked orange yam
Baked potato
Carrot and sweet corn kernels

14b) Smothered pork chop
Steamed long grain white rice
Sweet corn kernels

15b) Italian sausage with peppered onions
Vermicelli pasta noodles
Green peas

16b) Chicken breast marinara
Vermicelli pasta noodles
Green snap string beans

17b) Smothered pork chops
Steamed long grain white rice
Steamed whole baby carrots and green peas

18b) Flank steak with peppers and onions
Egg noodles
Green beans

19b) Chicken breast marinara
Vermicelli pasta noodles
Mixed vegetables

20b) Braised pork spare ribs
Fried rice with bean sprouts and snow peas
Oriental vegetables

APPENDIX F

SAMPLE OF NUTRITIONAL ANALYSIS

24 hr. recall
eugene 5a

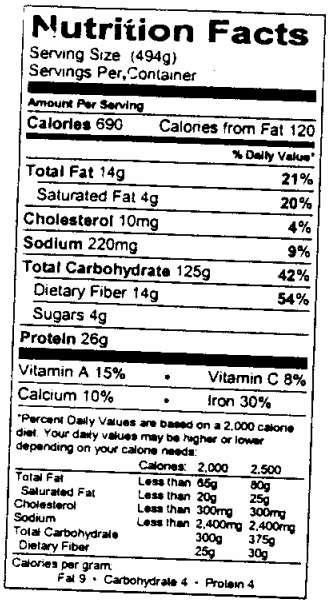
February 21, 2001

Total Weight: 2467.93 g (87.05 oz-wt.)
Serving Size: 493.59 g (17.41 oz-wt.)
Serves: 5.00

Amount for 5 servings	Food Item	Amount for 1 serving	Foodlist ESHA Code
0.166 lb	Broiler/Fryer Whole Chicken Fat-Raw-Ea	0.0332 lb	8687
0.444 oz-wt	Whole Wheat Flour	0.0888 oz-wt	38032
0.05 oz-wt	Table Salt	0.01 oz-wt	26014
0.05 oz-wt	Black Pepper	0.01 oz-wt	26016
0.02 oz-wt	Garlic Powder	0.004 oz-wt	26007
0.055 lb	Whole Wheat Macaroni-Cooked	0.011 lb	38110
0.05 tsp	Table Salt	0.01 tsp	26014
0.22 fl oz	Whole Milk-3.3% Fat	0.044 fl oz	1
0.44 oz-wt	Cheddar Cheese-Shredded	0.088 oz-wt	1008
0.055 tsp	Black Pepper	0.011 tsp	26016
0.1 tsp	Table Salt	0.02 tsp	26014
0.1 tsp	Black Pepper	0.02 tsp	26016
0.4 oz-wt	Broccoli Spear (5"Long)-Raw-Each	0.08 oz-wt	5027
0.4 oz-wt	Cauliflower-Cup Measure-Raw	0.08 oz-wt	5049
0.4 oz-wt	Carrots-Raw-Grated-Cup	0.08 oz-wt	5046
0.2 oz-wt	Green Peas-Raw	0.04 oz-wt	5116
0.2 oz-wt	White Onions-Raw-Chopped-Cup	0.04 oz-wt	5101
0.2 oz-wt	Sweet Green Bell Peppers-Boiled-Choppe	0.04 oz-wt	5126
0.4 fl oz	Buttermilk-Cultured, from skim milk	0.08 fl oz	7
5 lb	Whole Wheat Macaroni-Cooked	1 lb	38110

Nutrients per Serving

Calories	688.89	Fat - Total	13.69 g
Protein	26.37 g	Saturated Fat	4.09 g
Carbohydrates	124.68 g	Vitamin A RE	97.43 RE
Dietary Fiber	13.54 g	Vitamin C	4.88 mg
% Calories from fat	17 %	% Calories from carbs	69 %



Nutrition Facts

Serving Size (494g)
Servings Per Container

Amount Per Serving

Calories 690	Calories from Fat 120
	% Daily Value*
Total Fat 14g	**21%**
Saturated Fat 4g	**20%**
Cholesterol 10mg	**4%**
Sodium 220mg	**9%**
Total Carbohydrate 125g	**42%**
Dietary Fiber 14g	**54%**
Sugars 4g	
Protein 26g	

Vitamin A 15%	•	Vitamin C 8%
Calcium 10%	•	Iron 30%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

eugene 5a
2/21/01

24 hr. recall
eugene 5a February 21, 2001

Total Weight: 2467.93 g (87.05 oz-wt.)
Serving Size: 493.59 g (17.41 oz-wt.)
Serves: 5.00

Ratios and Percents

Source of Calories

Protein	15%
Carbohydrates	69%
Fat - Total	17%
Alcohol	0%

Source of Fat

Saturated (7 - 10%)	5%
Mono Unsat (10 - 15%)	6%
Poly Unsat (up to 10%)	4%
Other/Missing	2%

Exchanges

Bread / Starch:	7.0	Fruit:	--
Other Carbs / Sugar:	--	Vegetables:	0.1
Very Lean Meat / Protein:	--	Milk - Skim:	0.0
Lean Meat:	0.1	Fat:	2.2

Ratios

P : S (Poly / Saturated Fat)	0.78 : 1
Potassium : Sodium	1.20 : 1
Calcium : Phosphorus	0.22 : 1
CSI (Cholesterol / Saturated Fat Index)	4.72

24 hr. recall
eugene(SEVEN B) February 21, 2001

Total Weight: 892.04 g (31.47 oz-wt.)
Serving Size: 892.04 g (31.47 oz-wt.)
Serves: 1.00

Ratios and Percents

Source of Calories

Protein	21%
Carbohydrates	51%
Fat - Total	28%
Alcohol	0%

Source of Fat

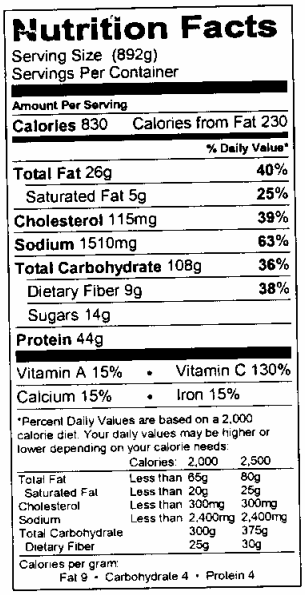
Saturated (7 - 10%)	5%
Mono Unsat (10 - 15%)	7%
Poly Unsat (up to 10%)	14%
Other/Missing	1%

Exchanges

Bread / Starch:	6.1	Fruit:	--
Other Carbs / Sugar:	--	Vegetables:	0.7
Very Lean Meat / Protein:	3.8	Milk - Skim:	0.3
Lean Meat:	--	Fat:	4.4

Ratios

P : S (Poly / Saturated Fat)	2.69 : 1
Potassium : Sodium	1.93 : 1
Calcium : Phosphorus	0.23 : 1
CSI (Cholesterol / Saturated Fat Index)	10.81



Nutrition Facts

Serving Size (892g)
Servings Per Container

Amount Per Serving

Calories 830 Calories from Fat 230

	% Daily Value*
Total Fat 26g	**40%**
Saturated Fat 5g	**25%**
Cholesterol 115mg	**39%**
Sodium 1510mg	**63%**
Total Carbohydrate 108g	**36%**
Dietary Fiber 9g	**38%**
Sugars 14g	
Protein 44g	

Vitamin A 15% • Vitamin C 130%

Calcium 15% • Iron 15%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

eugene(SEVEN B)
2/21/01

Total Weight: 892.04 g (31.47 oz-wt.)
Serving Size: 892.04 g (31.47 oz-wt.)
Serves: 1.00

Amount for 1 serving	Food Item	Foodlist ESHA Code
1 lb	Baked Potato-Flesh Only-Long	5129
0.6 oz-wt	Buttermilk-Cultured, from skim milk	7
0.083 tsp	Garlic Powder	26007
1.33 fl oz	Whole Milk-3.3% Fat	1
0.083 tbs	Table Salt	26014
0.083 tsp	White Pepper	26037
0.166 lb	Zucchini Summer Squash-Raw w/Skin-Cup	5326
0.166 lb	Summer Squash (All Varieties)-Raw-Cup	5151
0.66 oz-wt	Buttermilk-Cultured, from skim milk	7
0.083 tbs	Table Salt	26014
0.083 tsp	White Pepper	26037
0.416 lb	Channel Catfish Fillet-Wild-Raw	17033
0.08 tsp	Table Salt	26014
0.08 tsp	Black Pepper	26016
0.08 tsp	Red Cayenne Pepper	26027
0.04 tsp	Ground Basil	26001
0.04 tsp	Ground Oregano	26009
0.08 tsp	Paprika	26010
0.66 fl oz	Corn Salad Oil ADM	8664

Nutrients per Serving

Calories	830.20	Fat - Total	25.93 g
Protein	44.27 g	Saturated Fat	4.95 g
Carbohydrates	107.84 g	Vitamin A RE	102.44 RE
Dietary Fiber	9.44 g	Vitamin C	78.50 mg
% Calories from fat	28 %	% Calories from carbs	51 %

VITAE

The author was born in Accra, Ghana, in 1962, and earned a bachelor's degree in Food Technology from the Slovak Technical University, Bratislava, Slovakia, in 1990. He then earned a master's degree in medical sciences (Human Nutrition) at the University of Sheffield, United Kingdom, in 1994.

He came to the United States in 1995. He enrolled at Louisiana State University in the fall of 1999 to pursue a master's degree in Human ecology. He eventually intends to pursue a doctoral degree in Human Nutrition.